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FORESTRY IN ITS NATIONAL AND ECONOMIC ASPECTS

BY JOHN SUTHERLAND, C. B. E., F. S. I.

Assistant Commissioner for Forestry in Scotland

In the United Kingdom land has never been considered as a whole from the point of view of obtaining the maximum of production from every part. It has unfortunately been a fruitful source of political controversy, and it has been free to uncontrolled acquisition for pleasure by those desirous of leisure or of possession or imbued with the primeval instinct of sport. It has also been bought and sold for profit, but it is a curious circumstance that, except in the immediate vicinity of cities, ownership has never yielded a reasonably adequate return for the capital invested in it when the recognized obligations pertaining to ownership have been disbursed. This situation has arisen through our feudal system and to some extent through our wealth as a nation; our ardent willingness to accept and pay for imported produce easily freighted from overseas and also because the soil has never been held under any governing principle of utilization to the best advantage. Even at this time with voluminous legislation rapidly accumulated during the last decade, it cannot be said that there is any really high policy determining the proportion in which the land should be divided for all the varied purposes of national support or security. All these circumstances have contributed to the unfortunate neglect of afforestation in this country.

Virgin forests covered all European countries including the United Kingdom. They also flourished on the American Continent and they have more or less passed through similar phases as the agricultural and industrial development of each country became more intensive. Originally they were the haunt of the hunter and the hunted and nature held sway in propagation and destruction. The product of

the forest was of no value; it was not protected in any way, and great fires periodically swept over extensive areas. With the gradual increase of population the demand for food called for agricultural crops and pasturage for stock. The forests were then found to be in the way and great clearances were ruthlessly effected. With industrial progress, wood, essential in some degree in practically every industry, was found to be in growing demand, and every great European State, except Britain, became alive to the importance of afforestation as a national project and devised laws for the re-instatement and maintenance of forest areas.¹

All afforestation in this country has, as a consequence, been left to sagacious individual enterprise or to haphazard inclination. For over a century the claims of forestry as a national undertaking have been urged by independent and patriotic economists, by scientific and commercial associations, by agricultural and silvicultural societies, and while strongly recommended by many parliamentary commissions, no direction was given by any British Government until two years ago.

Wood, like water and coal, is so essential to the existence of man that until a shortage occurs we imagine that it must be always at our hand. Content to live too much in the present and forgetful of the future, we readily accepted imported timber, distributing for it among other nations many millions sterling.² This timber was in great quantity received from virgin, or from well-managed forests, where States had

¹ History of Forestry. Dr. Bernhard E. Fernow.

² The following is the average quantity and value of timber annually imported during the five years 1909-1913:

	Tons	Value, £	Value per ton, £
Wood and timber.....	9,904,451	25,415,376	2.566
Furniture woods	299,857	2,146,045	7.157
Pulpwood	859,451	4,058,498	4.664
Total.....	11,063,759	31,619,919	2.858

Minor forest products, wood manufactures and chemical products to the value of £8,767,033 were also imported.—*Vide Board of Trade Returns.*

Timber is measured by various methods, a combination of old national customs and of modern application to them.

The Board of Trade "quantity" returns are prepared partly in "loads" and partly in tons, and the use of both measures is inconvenient for general purposes. Authorities state the content of a "load" as from 35 cubic feet to 50 cubic feet. In abstracting these returns the "load" is taken as equivalent to one ton. It is sufficient as an indicator for the purpose of this paper. The universal application of the metric system and the adoption of one code of weights and measures for timber would be of great service to silviculture and to commerce.

legislated for the encouragement of public and private effort in forestry.

Home timber was not considered good enough for any but the roughest manufactures, and this was chiefly due to the fact that it was grown on small areas and the supply was never of the regular quality or dimensions of imported material. The distribution of woodlands also has been such that at no one place could any trader rely upon a continuous supply of trees sufficient to encourage the permanent establishment of mills at any selected center. The home manufacturer was at a distinct disadvantage and unable to compete with the importer. It also followed periodically that existing isolated woods were extensively destroyed by storm because they were planted without discrimination or regard to protection, and the heavy "falls" resulting from these wind storms exceeded the requirements of the limited home trade and temporarily created a general reduction in the market value of trees to the owner. These experiences helped to lead to the belief that timber growing was not a business proposition.

The estimated area under wood in 1914 in Britain was 3,043,300 acres or 4 per cent of the area of the United Kingdom. On the other hand, German woods occupied 25 per cent, French forests 18 per cent, and so small a Kingdom as Belgium had 17 per cent. These figures are quoted to indicate the neglect of British forestry, and even the estimated 4 per cent cannot claim any real accuracy because the method of computation was never reliable. But if this estimate is accepted it is now certain that at least over one-sixth of the whole has disappeared during the war, and that this country has more than ever to subsist upon supplies from abroad. The misfortune does not end here, for the best and most marketable of our home woods have been depleted in the last six years. What remains is an ill-assorted widely scattered remnant, not of real forest, but of wood, a large proportion of which is of no marketable value because it has been grown without any conception of co-ordination or economic policy.

Although this description of our timber reserves as a whole is accurate, it would be ungracious to omit to acknowledge the laudable and unaided efforts during the last century to establish woods, of which there have been many, for such woods as exist and the woods which were available for exploitation in our extremity during the war were established by steadfast individual effort, and the admittedly valuable silvicultural knowledge in our possession has been compiled and acquired through them.

By way of illustration it is instructive to compare the British position with that of France. Her forests in 1914, excluding unproductive areas in high elevations, were 23,228,340 acres in extent and produced a normal annual felling crop of 23,500,000 tons of timber³ divided into two categories (1) wood for trade and manufacturing purposes, and (2) firewood. The proportion of the former was 6,700,000 tons.⁴ The firewood, 16,800,000 tons, was never wholly consumed during any year of the war. At the end of two years of hostilities the French estimate of the total consumption of her forest wood for trade and manufacturing and war purposes was 7,000,000 tons. It is calculated that her own consumption for the remaining period, August, 1916, to November, 1918, would not have exceeded 7,000,000 tons. The British acquisitions in French forests are believed to have been approximately 4,500,000 tons, and the American purchases were about 5,000,000; in all 23,500,000 tons, or throughout the war 3,300,000 tons less than the normal crop which on the estimate of 6,700,000 tons a year would have been 26,800,000 tons.

It may be therefore accepted that except for the destruction of one million acres of forest land through enemy occupation and general artillery fire France has maintained her actual timber resources in a wonderful degree, although on the other hand it must be acknowledged that there was an over exploitation of her coniferous woods.

The war opened a new era of understanding. It was never before thoroughly realized in Britain that timber was not only essential in every known industry, but that without it in the field of battle the conflicting forces were helpless. The immediate effect of the German declaration in August, 1914, was a rush by all belligerents to secure supplies. Nations, allied or otherwise, competed in the market for timber. Prices immediately soared and steadily increased through the four years of war. So serious was the competition that the allied nations were compelled to co-operate in purchase and to divide the supplies which yearly became more scarce. Britain more than any other great power was dependent upon timber from elsewhere. Germany, Austria, and France were in possession of enormous forest reserves. Russia was fortified by vast national woods and State

³ Through this paper one ton of timber in the round, that is, as felled in the forest, is taken as equivalent to 35 cubic feet. It approximates to the cubic meter which is 35.31476 cubic feet, and in a wide period of observation it has been found to be reasonably reliable. See footnote 2.

⁴ Estimate of Commandant Thoillier, Inspecteur des Eaux et Forêts, an eminent French silviculturist, January, 1917.

forests. America, where forest administration was in operation, and though in possession of resources, was compelled to obtain timber in Europe because she could not rely on shipping across the Atlantic. Possible sources of supply, as for example from Canada, were impeded for the same reason. These experiences in relation to the American Continent would point to the absolute and undesirable dependence of Britain upon European States for wood in any future emergency.

As supplies diminished during the course of hostilities and sea carriage became increasingly uncertain and insufficient the Allies had to fall back upon the forests of France.⁵ A beginning in that country was made by Britain in 1916, and this inroad upon France, already mentioned, so developed that at the termination of the war 45,000 British and Colonial troops were engaged in exploiting, manufacturing, and transporting timber on French soil. America upon entering the conflict joined in this exploitation and six months before the Armistice her operating forces in the woods numbered 31,000 men.⁶ Nor was this the full force at work in the forests of France, for during the four years she continued to export unit wood for the mines in South Wales, without which the maintenance of our coal requirements for the Navy would have been endangered, and our strength as belligerents have been seriously handicapped.

When every other representation failed the experiences in war have brought forestry into recognition in this country, and the Forestry Commissioners have been authorized to embark upon a program of State Afforestation, which although moderate in extent and not fortified by any strong protective or compulsory powers, marks an era in the development of the nation's resources. During the first

⁵ During the five years 1914-1918 the average quantity and value of timber annually imported was:

	Tons	Value, £	Value per ton, £
Wood and timber.....	5,377,622	28,475,305	(a) 5.291
Furniture woods	176,809	2,144,321	(b) 11.562
Pulpwood	685,239	7,955,256	(c) 11.609
Total.....	6,239,670	38,574,882	(d) 6.150

Other products of wood represented a sum of £9,761,068. By comparison with the figures in footnote 2 it will be seen that for the previous period of five years the average value was £2.858 per ton, whereas during the war period it had increased to £6.150 per ton. This by no means represents our actual expenditure on timber. Large purchases, for example, were made in Switzerland and from there went direct to France and Italy and could not be reckoned as imports to Britain.

⁶ Studies in French Forestry. Theodore S. Woolsey, Jr.

ten years the Commission is empowered to afforest 150,000 acres. It is not proposed to follow the other schemes inaugurated for further supplementing the growing stock of timber by grants and loans to local authorities and to landowners, but it was expected that by such and other means the actual afforestation could be increased by 100,000 acres, making a quarter of a million acres in all in the first decade. This is only the initial stage of a greater program (for afforesting altogether 1,770,000 acres with coniferous trees during the remaining years of this century, or which it is recommended that two-thirds, or 1,180,000 should be finished over the first forty years.⁷ This will be, if accomplished, a great advance, but it cannot be achieved unless landowners, large and small, energetically share in the operation. While it is necessary that the State should possess forests of large extent, as in other countries, it is especially to be urged that the individual owner and all public authorities should participate in the creation and maintenance of forests. The interest in woodlands must be diffused throughout the country, and the landowner, corporate or private, should be encouraged to plant by subsidies, grants or advances upon terms sufficiently comprehensive to enlist active co-operation. Such encouragement might, in equity, on the other hand carry obligations to the State such as compliance with regulations for the protection of neighboring timber crops from attacks of fungi or pests, the destruction of rabbits and squirrels, the observation of rules for preventing fire, the prohibition of excessive fellings, and specially to reforest felled areas from which substantial revenues have been obtained. Any undue encroachment upon forest reserves by excessive fellings should be one of the first objects attainable by a reasonable system of assistance and control. The Government in 1919 assigned the sum of £3,500,000 for carrying out the ten-year program. It is not the purpose here to criticise the limitations of the sum, but rather to welcome the advent of a well-conceived effort to establish silviculture as a national project, but the importance of the development of our natural resources and the proportion which the land of the country contributes to the national exchequer is not always remembered when claims for development are urged upon the State. Land, that is, heritable property of all kinds, including buildings, during the five years, 1909-13, provided annually, in respect of ownership and occupation, a sum of £11,944,887 to the Inland Revenue, for the succeeding five years, 1914-18, from

⁷ Report of the Forestry Sub-Committee of the Reconstruction Committee, May, 1917.

the same source £29,185,189 was the yearly average payment. The authorized expenditure upon this silvicultural project, £350,000 per annum, represents only 1.19 per cent of the average annual exchequer receipts over the last five years. As a charge per capita on the country it amounts to 1.85 pence—a very insignificant sum. The expenditure is mainly an investment by the State in land and forests and not merely a contribution for the development of what can fairly be claimed to be a key industry. It is absolutely economic in essentials and when it is remembered that the payment serves the two-fold purpose of establishing State forestry and of prosecuting research and promoting silvicultural education it may be claimed that neither the charge upon the revenues of the country or upon the unit of population is other than moderate.

As a consequence of our open market and of our capacity for consumption of food and usable products of all kinds, our revenue from land for cultivation or for pasture has passed through varied vicissitudes. At some periods it was profitable to raise crops, at others it was more profitable to rear stock and so the value of arable or of grazing land has fluctuated with the markets. For afforestation no arable land is required—hill pasture, good and bad, and waste land only should be the site for tree roots. There have been periods when great areas of pasture have been unlettable and practically non-productive. Similar experiences may again be in store, and when they come it will be prudent for the State to consider whether a more rapid expansion of afforestation should not be authorized. Trees, when grown in large areas under good management with proper protection are a reliable steadily growing crop, as stable, if not more stable, than any other raised on the soil, and the rental value of forest land need never be reduced, in fact by systematic forest management it should increase in silvicultural value.

It so happens that the world demand for coniferous timber far exceeds that for deciduous wood, the proportion is roughly 9 to 1, and for that reason, as well as the pressing need for rapid accumulation of reserves, the situation of our hardwood supplies is not discussed. Coniferous trees grow and mature with much greater speed than the other class of trees, and the reserve of the latter in this country, when supplemented by the great resources of our Colonies, is not exhausted, and it should therefore, for the present, be sufficient to concentrate every energy upon the propagation of the more rapid growing softer woods.

The consumption of wood has steadily increased throughout the world during the past century. There is no present prospect of a diminishing demand, and when and where it can be grown to produce more in quantity and value than by any other existing method of use, it would seem to be good policy to afforest if the true principle of utilization is to be properly maintained. For centuries the mountains and hills have been, by wind and rain, gradually but surely deteriorated. There has been no attempt to check the ravages of the elements, and when the actual soil covering is not removed from the lower and more level areas, water is carried down upon them and there rests and diminishes or destroys fertility. The process must be evident to everyone, but few give it a thought. Trees hold the soil; they form the best resistance to river floods. Monsieur Jacquot in *La Forêt* describes them as the "sovereign regulator of waterflow." It is properly claimed that where afforestation is applied this destruction will gradually cease, and the humus accumulated by the tree growth and the absorption of moisture by the trees will not only fix the soil but improve the drainage of surrounding areas and enhance the value of the site for future silvicultural crops. The first result from afforestation is therefore the improvement of our primary natural asset—the soil. It represents reclamation of the best type and can be carried out at less expense than by any other method.

To city corporations in possession of extensive catchment areas surrounding reservoirs the application of afforestation is of the utmost consequence. The forest floor regulates the distribution of underground drainage. It is found that water on open land evaporates six times more rapidly than in the forest. It therefore follows that an afforested catchment area regulates and prevents waste of water and besides provides the further advantage of protection against the risk of impurities entering the supply—a risk well recognized by sanitary authorities.

A further direct advantage to the nation is that of raising a greater volume of production. To quote a renowned economist,⁸ "Whatever causes a greater quantity of anything to be produced in the same place tends to the general increase of the productive powers of the world." This aspect can be considered now with some confidence as a result of an investigation into growth development by the Forestry Commission.⁹

⁸ The Wealth of Nations. Adam Smith.

⁹ Bulletins Nos. 1 and 3 issued by the Forestry Commission.

From a study of these records it will be found that taking the mean annual increments of the average quality classes of the three species forming the predominating forest stock of this country, that at 70 years of age, Norway spruce yields 123 cubic feet, Scots pine yields 85 cubic feet, Larch yields 70 cubic feet per acre per annum. The measurements have been taken over well-selected areas throughout the United Kingdom and should fairly indicate the probable increment of the new forests to be formed by the State. Upon the presumption of an approximately equal distribution of these three species the average yearly return would be 90 cubic feet. Other species introduced to Britain, such as Sitka spruce and Douglas fir provide records much more encouraging and they will undoubtedly form part of the new afforestation. Instances of increment in the former have disclosed 159 cubic feet, and in the latter 172 cubic feet each year. These figures indicate an annual growing timber weight of from about $2\frac{1}{2}$ to 5 tons on each acre, but if our calculations are only based upon an overhead yield of say two tons per acre or 70 cubic feet the value of the product at recent timber prices might be £3:10/— . As land used for timber growth will seldom exceed a rental value of three shillings yearly, over extensive areas it will be considerably less, it can be claimed that no land let at this sum can yield in quantity or in revenue any figures approaching those of the forest.

Afforestation by the State creates a national asset—an asset hitherto non-existent—and one which when well directed cannot fail to return interest upon the capital invested. If during the first eighty years of last century the State had invested £3,000,000 in coniferous afforestation it would have been possible during that time to plant 1,000,000 acres at £3 per acre. By continuous forest management during the interval on an 80-year rotation and assuming an annual "cut" of 12,500 acres per annum from 1880 onwards a timber reserve would have been available in 1914 of 250,000 acres of plantations 20 years and under, 125,000 acres of plantations 21 years to 30 years, 600,000 acres of plantations and woods 31 years and over, 975,000 acres in all. Without taking into account the 375,000 acres of plantations up to 30 years old the crop of the remaining 600,000 acres would have been available and in condition for use for military and commercial purposes during the war. It would upon the moderate basis of crop increment already quoted approximate to 2,000,000,000 cubic feet or 57,000,000 tons—a quantity of coniferous wood more than sufficient to have made the nation independent during the whole of the great war.

But contemplate the other advantages of such a reserve during that time: (1) The release of shipping for other supplies and a reduction of internal transport. (2) The saving of loss in exchange and of an enormous expenditure in sea freight. (3) The retention of capital estimated at £150,000,000 in our own country when it was really required. (4) The existence of an organized well distributed industry established 34 years prior to the war with an annual timber felling of over 2,000,000 tons.

Continuous and regular fellings of wood create industrial enterprises—all commercial undertakings—and these become, through taxation, a source of revenue to the State. It can therefore be claimed that afforestation, public or private, will bring financial benefit to the nation's exchequer.

The depopulation of rural areas throughout the United Kingdom is to be deplored, and it has been and still is a subject discussed from various aspects without any real result or even partial check. It is often asked why this process of convergence into city environs continues, and the only answer would appear to be the inability of the people to find profitable employment in the country, and especially in the hill regions where afforestation can be prosecuted to the best advantage. Small holdings, which are in every respect desirable, and the only solution hitherto offered to stop the drift citywards, are not enough. They have been in existence for generations and have never abated the depopulation as proved by even the latest census returns. The average small holding is insufficient to support a family in prosperity, and unless supplementary occupation can be obtained the family must leave home. Afforestation exactly meets this need by the provision of employment.

In the process of planting machinery takes a lesser share than in probably any other rural industry. From the collection of the seeds and the actual planting to the reaping of the crop in the forest manual labor predominates. It is just of the type fitted to the country man; young and old can participate and for every pound sterling invested by the State in planting seventy-five per cent goes to provide wages for the worker.

Until British forests become actually available for exploitation the outlet for labor will consist chiefly in planting and the other operations precedent and subsequent to the formation of them. It will, however, be more extensive and more regular than other forms of employment on areas of a similar kind, and when the tree crops fall to be thinned

and harvested the share of labor will increase. The combination of small holdings and forests can perhaps be best exemplified by the result of an investigation in Bavaria, where the productive expense of forest was in 1908 about 1,800,000 acres. The employed in the Bavarian forests numbered 74,622. This number was, on classification, found to be distributed as follows:¹⁰ 51 per cent small holders, 12 per cent seasonal workers, 18 per cent unskilled workers, 1 per cent superannuated people, 18 per cent regular foresters. Here is a striking proof of the share taken by the small holder in established forest regions. It must, however, be remembered that this represents only the employment in absolute forest work, it does not include what is a still more valuable sphere for activity the conversion of the tree into sawn material. To bring out the actual "employment" advantage, the position may be stated in this way—present day costs of material and wages being assumed. An acre of land used as pasture, suitable for trees, will over a sixty-year period give 2/6 or 3/— yearly to the worker. An acre of forest now being created on similar pasture over the same period will provide £3 per acre to the worker, that is, in the operations of formation, maintenance, protection, thinning, felling and sawing. The further utilization of the sawn material into all the articles into which the wood is formed, will be the important sequel to the establishment of standing forests. Many examples in other European countries of the effect of afforestation in stabilizing the country population could be quoted, but one may suffice. It is in France, in the Department of Les Landes where just over 100 years ago afforestation was commenced. About one-half of the whole Department, which extends to 2,300,000 acres is under trees. The population, early in the nineteenth century was 69,000; in 1911 it was 289,000. This is an increase of 318.8 per cent. There is one inhabitant for every 8 acres instead of about one inhabitant for every 34 acres when afforestation was initiated. Timber industries are well established in which the population are actively employed. Between 800 and 900 sawmills are worked and 30,000 people are employed in the woods. Inverness, a Scottish county, is greater in extent than Les Landes and the population (Census, 1921) is only 82,446 or one inhabitant on 32.7 acres, and this county, like many other counties in Britain, offers as good a field for afforestation as Les Landes. The Government of France conceived afforestation there and insisted upon the prosecution of it,

¹⁰ Economic Forestière. G. Huffel, 1919.

taking the ground from those who refused or who were unable to plant, and returning it to them after the State became reimbursed for the afforestation expenditure upon it. In France the depopulation is found to be seven times greater in deforested departments than in the fifty-seven departments in which forests are maintained. It is surely of consequence to raise and employ a healthy country population, and it may be asserted that forestry will help to secure on the land a prosperous contented people.

Still another benefit will accrue by the adoption of reforestation, and that is security in warfare. Some would maintain that it is inconceivable that we should again be involved in a war of the magnitude of the last; others hope that the battlefield will no longer be the method for deciding the fate of nations; but the history of all time would not encourage the belief that only peaceful courses will rule among generations to come. The future alone can divulge the diplomatic attitude of States, and for the moment ships of war are on the stocks and armies are in being, and it would be ill-advised policy to abandon other means for our protection. Aerial warfare, so recently developed, will not be abandoned if hostilities again emerge, and forests have been found a better shelter and protection against attacks from the sky than any known device of man. In other spheres of fighting forests also serve an important function, and we are for all such purposes devoid of them now.

Trees give shelter to man and to beast; they protect growing crops from the storm and in forest form will afford protection to both farms and grazings over wide expanses of presently weather-beaten country. For the people there is no fairer or more entrancing pleasure ground than the forest. Trees should be a delight to every citizen. They are an active force impelled by nature to raise their crowns ever upward and to expand in welcome shade over the earth. Forests beautify the country and entice all birds and living things to congregate in them. It is assuredly strange that the greatest European State has neglected to possess them. It has been said that to plant trees is an act of faith, and that faith thus embodied does much to realize that in which it believes. We must have faith in this undertaking. Hitherto it was the opinion of many that afforestation was an undertaking for any generation except the living, that as this country had survived without forests it could still so survive, but if we were similarly content in all other enterprises in these islands our industrial advancement would never have been achieved. In coal we have a

created product, forests we have to create, but at an expense far less than any outlay involved in the opening of a coal field. It so happened that recently our coal supplies were temporarily withdrawn and in this internal domestic extremity we had to fall back upon wood for fuel, an experience of itself sufficient to bring more direct influence to bear on public opinion. Above all, it is to be desired that the progress of forest establishment should not be wanting in the support of the people or that it should be the subject of controversy of any kind. It is a necessary national enterprise for the present as well as for the future.

PROFESSIONAL ETHICS¹

BY FREDERICK E. OLMSTED

Forester for the Diamond Match Company

When is a forester not a forester?

Foresters themselves are often in doubt about this, being at a loss to know whether the work upon which they are engaged is forestry or something else. A score of years is a short time in the life of a professional society and it is too soon, perhaps, for the formulation of a code of ethics similar to those which have been built up by some of the older professions. We lack background, atmosphere, and the necessary volume of work upon which to construct our ideas of what is proper or improper from a professional standpoint. It is questionable, moreover, whether a written code of ethics is altogether desirable. Some of the older professional associations have written codes, others appear to flourish with unwritten codes. All of them, however, endeavor to live up to certain well-defined standards of conduct.

In spite of our newness, I am wondering whether the time has not come for a general discussion of this subject and, perhaps, for agreement on certain broad principles of professional bearing. Questions have already arisen, I think, which are of sufficient importance to demand our serious attention. My notion is that by a frank discussion of these questions at the present time we shall obviate much trouble later on. Formal action by the Society may or may not be desirable; the main thing is to bring out the consensus of opinion among foresters on certain general principles of professional conduct, and to see that all foresters are informed of this opinion.

I cannot help contrasting the atmosphere of the old baked-apple days, at the beginning of things, with that of the present time. We were then, all of us, thinking of and believing in forestry. Are we all foresters now, or do some of us give our thoughts and endeavors to other matters which have little or nothing to do with the profession for which we were trained? I may have sensed the situation wrongly; but it

¹ Read before the Annual Meeting of the Society of American Foresters at Toronto, December 28, 1921.

strikes me that the professional atmosphere nowadays is a bit hazy, and that if we can clear it up to some extent we shall all be better off.

Let me remark that I claim no special purity of professional conduct for myself. Being, moreover, of a docile and non-disputatious temperament, I naturally hesitate to enter a field offering such evident chances for acrimonious debate; but as someone must start the proceedings, I venture the plunge. Let it be thoroughly understood, if you will, that the following discussion is wholly impersonal. I am attacking principles, not individuals.

Ethics as applied to foresters in Government service are, I presume, fairly well established by now. In my day cases arose from time to time which necessarily had to be settled without the aid of precedents or regulation. I refer to questions such as the propriety of a forest officer being interested in timber or livestock, interests which might well prejudice his official actions, consciously or unconsciously. No doubt there are now precedents and regulations to cover these and similar cases. Whether this is also true of State forest work I cannot say, for I am not sufficiently familiar with the situation in the various State organizations. If there should be need for a discussion of professional ethics among State foresters, it would seem appropriate that this matter be taken up by their newly-formed association. Foresters who act as instructors at the various schools of the country, are, I presume, teaching the ethics of the profession along with various and sundry other things, and I lack the temerity to question their methods. It is fair, however, to ask whether this subject is receiving such consideration as its importance seems to justify? Upon the forest schools rests a rather serious responsibility in this respect.

We have simmered down, therefore, to foresters in private fields of work. Although their total number is small when compared to the official class, foresters in private employ are becoming more numerous all the time, and their work is becoming more and more important. I venture the prediction that in days to come their number will exceed those in Government and State employ. In the private field of forest work we are confronted immediately with many puzzling questions, questions which cannot be solved in haste. Precedence is almost entirely lacking and, to the best of my knowledge, no guiding principles have ever been agreed upon, even informally. In this paper I cannot attempt to give a complete list of cases which appear to lie in or be-

yond the twilight zone. I must confine my discussion simply to a few of the problems which have been bothering my own mind for some time past, leaving it to others to round out the debate.

To start the ball rolling, is a timber broker a forester? Of course, there are various stages to this disease. Is it proper, for example, for a consulting forester or forest engineer to be interested in timber investments or timber speculations, in the buying or selling of timberlands either outright or on a commission basis? I am not discussing the legitimacy of the business of timber brokerage, as to which there is no question. I am discussing the effect of such a business on the standing of a consulting forester or forest engineer as a forester. If, for example, the forester engages in the work of timber estimating or cruising, which offers a large and desirable field of endeavor, how might this professional standing be affected by the fact that while estimating timber for one concern he is engaged in buying, or selling, or trading timber for other concerns in the same general region? Let us grant that his estimates are thoroughly honest; can he carry off this dual role of broker-forester quite without criticism? Is the case not very similar to that of a practicing physician who operates a chain of drug stores?

If the forester goes a step further and becomes a timber "factor" (whatever that may be), if his interests lie entirely in the business of timber brokerage and whatever forest work he does is merely an adjunct to the brokerage business, should he continue to be classed as a forester with a vote in the Society of American Foresters, or should he resign from the Society and call himself a timber broker, which he really is?

Closely related to the above is the case of a forester who enters the employ of a lumber company as a forester and then gradually forgets all about forestry, becoming a scaler, or grader, or logging boss, or woods foreman, or railroad engineer. Such a man is altogether justified, mind you, in turning into a perfectly good lumberman or engineer if he so chooses. He can be extremely useful in such capacities. The business of cutting down trees and marketing them with the greatest possible present profits, and with no other considerations, is a legitimate business just at present. But such a lumberman or engineer is not a forester. Even a so-called logging engineer can be highly proficient in his work without a knowledge of forestry, for he is concerned with

the construction of railroads or other lines of transportation and, in the great logging regions, with the mechanics of wire ropes hitched to trees and pulled by steam donkeys. Is a man who does these things, and does no forestry, a forester?

Should he continue to call himself a forester?

An architect who becomes a builder or contractor is no longer an architect. He passes out of the profession. One of the Canons adopted by the American Institute of Architects as a general guide reads as follows:

"It is unprofessional for an architect—

"(1) To engage directly or indirectly in any of the building or decorative trades."

Please bear in mind that I am not referring to foresters who become lumbermen and engineers and, in addition, practice forestry; nor to lumbermen and engineers who acquire a knowledge of forestry, and practice it. I am referring to those engaged in lumbering who have abandoned or who exclude the practice of forestry. Are such men justified in calling themselves foresters any more than a builder or contractor is justified in calling himself an architect? The very same question, of course, may be asked in the case of a forester who becomes a timber broker, for he leaves the professional for the commercial field.

Then there is the problem of what form a forester's compensation should be or should not take. Our troubles in this respect will doubtless be more numerous and more acute in the future. At the present time foresters are not over-burdened with financial offers in the field of applied forestry. Let me mention a single case, however, a case which in my mind involves a fundamental principle of ethics. A forester in charge of operations on a tract of private timberland may be compensated, in whole or in part, by a commission on the amount of timber removed. Is this method wise and seemly from a professional standpoint? Even if the best silviculture should call for skinning the lands as clean as possible and for paying no particular attention to them afterwards (which I cannot admit is ever the case), is not the forester placed in a thoroughly bad position? No matter how scrupulous he may be, it is clear that consideration for his income urges him in one direction whereas good forestry may point in quite the opposite way. Moreover, aside from the man's own standing, the thing is likely to reflect upon the profession as a whole. For example; when the lumbermen of a certain locality, after watching the work of a

forester, remark that "if you want to do as you please, employ a forester," is it not about time for the Society to show concern?

It may be of interest, in this connection, to quote from the Code of Ethics of the American Institute of Consulting Engineers:

"It shall be considered unprofessional and inconsistent with honorable and dignified bearing for any member of the American Institute of Consulting Engineers—

"(1) To act for his clients in professional matters otherwise than in a strictly fiduciary manner, or to accept any other remuneration than his direct charges for services rendered his clients. . . .

"(2) To accept any trade commissions, discounts, allowances, or any indirect profit or consideration in connection with any work which he is engaged to design or to superintend, or in connection with any professional business which may be entrusted to him."

Perhaps one of our most difficult questions relates to foresters who are employed by the various associations of those engaged in the exploitation of forest resources. Although many phases of this subject must remain intangible for the present, I am inclined to think that the profession as a whole will benefit from a frank discussion. The associations concerned are powerful organizations, and the influences they may exert for or against the practice of forestry are highly important. What are foresters doing with these associations, or what are these associations doing with their foresters? Much depends upon the answers to these questions.

I think I fully realize that a forester who enters the employ of a forest exploiting association has an exceedingly difficult row to hoe. He desires, or should desire, to lead the association and its members to begin the practice of such forestry as circumstances justify; while the association, through its members, is constantly kicking against the pricks and may be chiefly interested in using the forester not for purposes of forestry but for greater immediate profit in the business of forest exploitation. There is danger, therefore, that the forester may find himself drifting into work quite unrelated to such tasks as his training and experience have fitted him for, and may finally discover that he has abandoned his profession altogether. Here again there is no question of his legitimate usefulness in the field of commercial forest exploitation. The question is whether, if he ceases to think and act as a forester, he should continue to be called a forester, retaining such privileges as go with membership in the Society. If he becomes a commercial exploiter, pure and simple, is it not likely that he must

sanction, directly or indirectly, principles and methods which are opposed to those of his profession? Do not misunderstand me in this respect. I am not discussing a difference of opinion among foresters as to what particular method or procedure is applicable in a given situation. Disagreements on that score are both unavoidable and healthy. I am discussing a possible case in which the forester abandons forestry, in practice and in spirit, falling into the ranks of his commercial employers, thinking and acting as they think and act. Should he then continue to be classed as a forester?

I am not now making the statement that association foresters have ceased to be foresters. I am raising the question, for which there may or may not be ample justification.

As soon as we touch this subject we immediately run against the knotty question of what is and what is not forestry, and then we're off! The field for argument is unlimited, and to a certain extent intangible. If I'm not mistaken, however, there are some things upon which most of us will agree. For example, take such matters as costs of production; mechanical processes connected with logging, transportation and milling; statistical work on stocks, manufacture, orders, sales and shipments; scaling, grading and marketing; compilation and distribution of data on prices. Is such work forestry? Take, also, work in the nature of propaganda, advertising and legislative lobbying for commercial ends, with the viewpoint of the profession of forestry so far in the background as to be negligible. Can we not agree that all such work could be satisfactorily done by men without training in the science and art of forestry? Are these not matters which a good business man with a knowledge of engineering, a head for figures, and a genial disposition could undertake with entire satisfaction to his employer? If an association forester is engrossed in such matters to the exclusion of the art which was the chief aim of his professional training—namely, forest perpetuation—can he with fairness claim to be practicing the profession of forestry? What is more to the point, can he claim that his opinions on matters of forestry represent the views of professional foresters? Briefly, is he a forester, with the privilege of speaking as a forester?

The prevention and suppression of forest fires have come to be considered as duties peculiar to the forester. To many, I might add, fire protection is thought of as the forester's sole field of endeavor. It is needless, before an audience of foresters, to dwell upon the importance against fire. I should like, however, to inquire whether we are not now face to face with the necessity of applying silvicultural principles in addition to protection against fire. Can we, in other words, claim to be foresters solely because we are occupied in the protection of forest lands. The forester's work is essentially creative. Let us by

all means have the best possible protection; but unless we also devote our energies to the creation and perpetuation of forests, we shall soon find ourselves protecting, at great expense, lands covered by a forest growth of small value. There may be instances where protection against fire, as a temporary expedient, is in itself good enough forestry; but, by and large, have we not reached the stage where we are justified in demanding from those who call themselves foresters something beyond the mere ability for organization and administration involved in protection against fire? It may be asked with some reason, I think, whether we have not largely over-done the fire protection cry. Most lumbermen are now heralding forestry to be nothing more than the prevention and suppression of forest fires, thus creating a situation not without embarrassment to foresters.

Is a man who makes it his business to spray orchards necessarily an orchardist?

* A broad view of the duties of association foresters seems to make a detailed discussion of their work of minor importance. The outstanding fact is this: The associations employing foresters are capable of exerting a tremendous influence for or against the advancement of forestry in the United States, and their foresters are in a position of peculiar responsibility, with unlimited opportunities for accomplishment. If foresters lead their associations as professional foresters, withstanding the constant pressure to slip down into the commercial, non-professional field, their work will be invaluable to the country and to the profession. If, on the other hand, they should cease to maintain a high standing as foresters, both the country and the profession would suffer severely.

Finally, is there or is there not a relation between the professional standing of a forester and his regard or disregard for the public welfare in his work? The loyalty of a forester in private employ to his employer is a most laudable thing. Equally praiseworthy, it seems to me, is a reasonable concern for the public good, and I do not believe that these two things need necessarily conflict. In the long run, of course, private and public welfare are one and the same thing. Can the forester afford to sanction plans or methods which, from the public point of view, are destructive in character, when he could, through a modification of such plans or methods, safeguard the interests of the state without working undue hardship to his employer? Does regard for the inter-relation of private and public forest interests place professional ethics upon too high a plane?

Have we not, in some or all of these questions, much food for thought? The present is a crucial time in the life of our profession and I can not help but feel that our responsibility is heavy. Let us remember that the practice of forestry must be brought about by foresters, and that the success we obtain will depend to a marked degree upon the professional standards we uphold.

FOREST MAPPING AND ESTIMATING FROM AERIAL PHOTOGRAPHS

BY ELLWOOD WILSON

Forester for the Laurentide Company

As foresters generally have shown much interest in the use of aircraft and aerial photography for making forest maps and estimates, reconnaissances, and so forth, it was thought that a description of a survey as actually carried out might be of interest.

The area about which information was wanted was situated 102 miles in an air line from the air station and about 24 miles from the railroad, 16 over a wagon road, and the remainder by water. A site was selected for a base, and an air engineer, a cook, camp equipment, and seventeen drums of gasoline were sent in by wagon and boat. Two tents were put up, one for sleeping quarters and the other for a mess tent. This was on the shore of a bay, and the site selected for an anchorage was sheltered from all winds, and the water was deep enough to bring the nose of the plane up on the sand without endangering the hull. The beach was sandy and flat, and by a little easy digging a small channel was formed into which the plane could be drawn so that the engineers could easily get at the rigging and engine, and also refuel.

The crew consisted of Pilot Maxwell, Forester-Photographer Townsend, Mechanic I. Vachon, and Rigger Hyde. The machine used was a Curtis H. S. 2 L. flying boat No. G-C. A. A. D.

Previous to beginning the work, the chief of party of another survey crew, which was engaged in a survey and estimate of a 50-square-mile tract about 54 miles south of the above base, was taken for a flight over the territory on which he was to work. He flew twice over the area with a map on which he made notations of the general lay of the land, the types of timber, and so forth, and this information proved of the greatest value in carrying out his survey.

The plane was moored out in the open during the duration of the survey, and in spite of rain, snow, and hail, suffered no damage and was continually on the job. Trips were made on cloudy and rainy days, and photography was carried on in winds up to 50 miles an

hour. The boats used have been in commission for four seasons, and will be used again this year, showing that there is a reasonable life for aircraft.

One interesting side line of this work was the discovery and reporting of forest fires. On September 1 a fire was sighted 18 miles away from the plane at 7.30 p.m. and the plane landed at the nearest telephone station and reported it. It is practically certain that the ground patrol would not have discovered the fire at this time of day, and it would probably have assumed quite large proportions before being discovered the next day. Another fire was reported on September 3, and on September 8 a report having been received that a fire had occurred on a certain lake, the plane was sent to investigate, and reported that there was not, and had not been, any fire. On all flights reports were made of fires burning, and areas already burnt were sketched and sent in to headquarters. Sketches made from the air were afterwards checked on the ground, and found to be almost as accurate as to areas as the ground surveys.

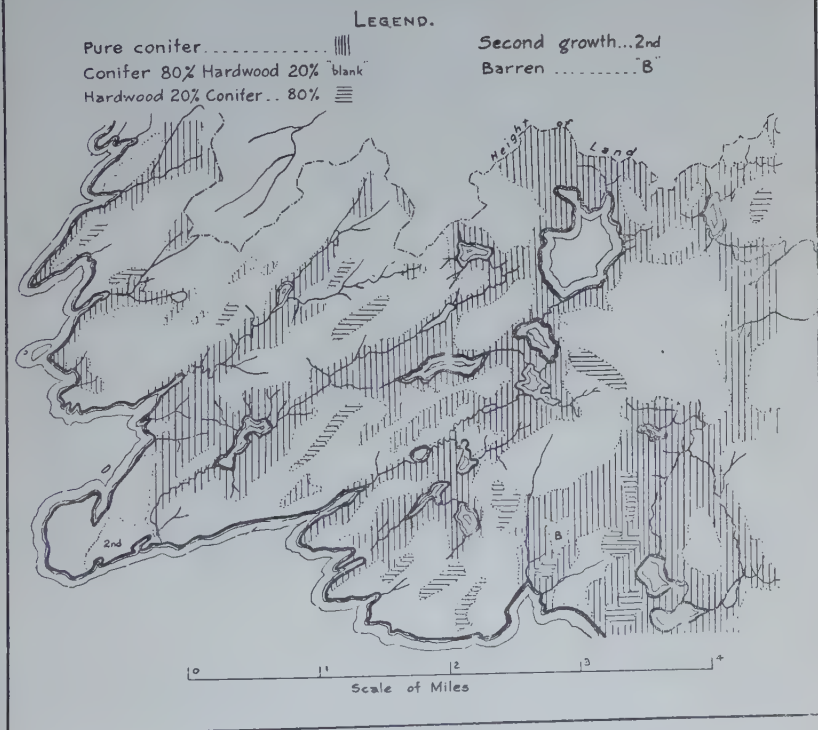
The total time spent in photography was 12.8 hours, and the area mapped was 140 square miles. This shows a performance of 10.8 square miles per hour of useful photos. The work was done at, as nearly as possible, an altitude of 5,000 feet, which gave plenty of detail for the interpretative work. In making a mosaic it is necessary to have the pictures overlap on all sides, and this was found difficult in high winds, but in ordinary weather went well. The photographer directed the pilot on his course by hand signals, and there was perfect co-operation between the two. No reconnaissance flights were made strictly for that purpose, but in test flights a considerable amount of reconnaissance work, sketching, and oblique photography was carried on.

There was already an accurate map of the water courses and lakes on the area, and when the photographs were finished the areas in the various timber types were transferred to it and the areas planimetered. The ease with which these could be read from the photos and their boundaries ascertained was remarkable. The types were divided as follows: Coniferous, containing 80 per cent or over of conifers, spruce and balsam or jack pine; conifer-hardwood, containing 60 to 80 per cent of conifers; hardwood-conifer, containing 60 to 80 per cent of hardwoods; barren, heath or treeless swamp and second growth, where young timber was coming in after burns. It was seen on the pictures that there were very many places where blow-downs had occurred

running from one to 50 acres or more. Most of these would not have been discovered by a strip survey with the strips located a quarter of a mile apart, but when their aggregate area was measured, it was found to be of importance. The percentage of the various types, as ascertained from the photographs, was as follows:

Conifer	35.7
Conifer-hardwood	56.1
Hardwood-conifer	2.4
Barren4
Second growth7
Water	4.7
Scattered blow-down2 per cent of timbered area

AREAS OF TIMBER TYPES TAKEN FROM AERIAL PHOTOGRAPHS.



By comparing the photos with those taken in sections where the amount of timber per acre had been carefully determined an approximate estimate of the timber was made, and sample plots for ground study were picked out as representing fair averages of the stand. A

party has now gone out to check up these sample areas, chosen from the photos, on which plots will be taken, all trees calipered, and the heights obtained. Measurements of the height and diameter growth will also be taken. This will give an accurate check on the stands of timber, and will show how accurately areas which look alike on the pictures compare with each other.

A line drawing herewith shows the appearance of the finished map, the cross-sectioning representing colors.

I am, unfortunately, not permitted to give cost figures for this work, for business reasons, but I can state positively that if the latest costs for estimating the sample plots mentioned above are taken, and added to the inclusive costs for the airplane work, salaries, fuel, insurance, depreciation, making of pictures (all on a basis of all the winter costs included), the final cost will be \$20 per square mile less than that charged by a large firm of consulting foresters for a big tract of land much more favorably situated and easier of access, and \$30 less than figures of one of the large companies for work done in 1920.

NOTES ON RELEASE OF WHITE PINE IN HARVARD FOREST, PETERSHAM, MASSACHUSETTS

BY J. NELSON SPAETH¹

Assistant to the Director

There are extensive areas of abandoned agricultural and pasture land in central New England on which inferior hardwoods such as grey birch, aspen, and red maple start simultaneously with white pine. Although there are generally at the start more than sufficient pines per acre to make a fully-stocked stand at maturity, on the majority of sites these are eliminated, almost completely, by the hardwood during the first 30 years in the life of the stand.

On the Harvard Forest disengagement cuttings which remove the hardwood, thus freeing the pine, have been carried out for 12 years. The results show that the operation is decidedly worth while from a financial standpoint. In order that some concrete facts might be presented to substantiate this statement a permanent sample plot was established in the spring of 1915. Two contiguous quarter-acre plots were staked out in a representative stand of young pine and inferior hardwood (mostly grey birch and red maple). This stand was on an average site—a fairly high Quality II for both pine and hardwood. Each tree was numbered with white paint and a brief description written from a careful study of the individual. The total height, average breast-high diameter, health and crown classes were recorded together with remarks as to the growing space, injury by whipping, etc. Under health class the following sub-divisions were recognized and are designated in the tables, by the accompanying symbols. N = normal, healthy or thrifty crown now making good growth, needles long and of blue-green color; N- = sub-normal, only slightly less thrifty than N; W- = slightly weak, needles somewhat shorter than in above and tending to be yellowish-green; W = weak, slow growth, short needles; W+ = very weak, little better than stunted or much suppressed; St = stunted or much suppressed, little growth, probably not able to recover if released.

¹ The author is indebted to Professor Richard T. Fisher for advice and suggestions.

The total number of living pines on one plot was found to be 97 and on the other 107, while the percentages of normally healthy, that is, N and N-, trees were 51 per cent and 39 per cent respectively. The plot of which the percentage of healthy trees was lower was selected for release, that on which the trees were in the best condition being left undisturbed as a control. All of the hardwood in the release plot was cut, due care being exercised not to injure the pines. The product of the cutting, $2\frac{1}{4}$ cords of wood on the plot or at the rate of 9 cords per acre, was worked up into cordwood and sold for fuel. Subsequent to this cutting nothing had been done either on the release plot or on the control. After five growing seasons, that is, in January, 1921, an examination in which each individual tree was studied and data noted as in the original record, showed the following significant result:

Changes in Percentages of Trees in the Various Health Classes During the Period from 1915 to 1921.

Health class	Release plot		Control plot	
	1915	1921	1915	1921
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
N	24	29	34	11
N-	15	16	17	11
W-	14	8	10	4
W	27	12	24	8
W+	6	6	4	0
ST	19	22	11	35
Dead	0	3	0	29
Missing	1	4	1	2
Total	100	100	100	100

It will be noted that on the release plot the percentages of trees in the classes N, N-, and W- shows but slight increase in 1921 as against 1915. This is to be expected since if the stand had been free to begin with there would have been a considerable decrease in number. The number left in these classes is sufficient to make a well-stocked stand at the end of 60 years, which is the accepted rotation for white pine on the Harvard Forest. On the control plot, however, the number of trees in these classes shows a considerable decrease and the present number is far too few ever to make a stand of normal density even though all the pines on the area could be released and recover. The critical point in the history of the stand when disengagement cuttings are effective has passed.

A summary of changes in health condition of the trees on the release plot is shown in the following table:

Health Conditions in 1921 as Compared with 1915.^a

	State of health		
	Improved	Same	Lower
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
Release plot.....	28	44	28
Control plot.....	3 ¹	14	83

^a *Example*—If a tree were classed as W in 1915 and in 1921 the same individual were classed as N— it would fall in the category of "state of health improved." If in both inspections it should appear as W it would be classed as "state of health the same." Whether the change be from one class to the one immediately above or below or whether it be through several health classes was not taken into account.

The injury inflicted on pine by grey birch, and to some extent by other hardwoods, is largely one of arrested growth due to whipping off of the terminal and lateral buds, thus limiting or wholly checking the development of the crown, rather than suppression by the cutting off of insolation. The greater injury occurs in winter when the hardwoods are devoid of foliage, often coated with ice, and weave too and fro in the wind. In the case of aspen, due to the more rigid character of the bole which tends to lessen the whipping action, and especially in dense growth of root suckers, the injury is much less by whipping in winter and largely one of suppression when in foliage. The injury which occurs when red maple is the principal hardwood is one of whipping in winter and shading in summer, both rather severe.

The biologically most favorable age or height for freeing pine is determined by the intensity of the struggle between the two elements in the stand, which in turn is greatly influenced by edaphic factors of site. On rich, loamy soils which are of high quality for the growth of hardwoods, the pine, though numerically superior in early life and very thrifty will, if no cutting is made, be eliminated almost completely by the hardwood. On sandy sites unfavorable to hardwood and suitable for pine the latter may persist until the maturity of grey birch subsequently forming a pure stand.

On an average site on which this mixed type exists in Central New England, one disengagement cutting made at the "critical age," that is, the age at which the pine is able still to recover and permanently keep ahead of the birch, will make certain a yield of at least 30,000 board feet of pine per acre at the end of a rotation of 60 years, and possibly 10 cords of wood in the disengagement cutting. If no such cutting is made an acre will have produced, at the end of 60 years, three crops of inferior cordwood on a 20-year rotation with a yield of 18 cords in each crop or total 54 cords of wood.

A study by Minuse² in 1914 was made with the purpose of determining the minimum age at which a single cutting would permanently free the pine. The method used was to inspect areas on which disengagement cuttings had been made in past years and from these to construct curves showing the growth of hardwood sprouts (height on age) and other curves showing the growth of released pine. Then by trial and error plotting of both curves on the same ordinate and abscissa an original height for pine was found at which if the hardwood were cut the pine would be permanently freed, the height growth of the resulting sprouts being insufficient for them to again reach the dominant crown class. The conclusions drawn from the study were that "there is a practical height for the white pine at which, if the hardwoods are removed, the released pine will not need further attention. If the overstory of hardwood is removed before the pine has attained this height a second removal cutting is necessary. The practical height for upland pasture pine, Quality II site, is when the pines average 15 feet if grey birch is the principal species in mixture, or when they are 12 feet high if red maple predominates." Grey birch sprouts show more rapid height growth than red maple. The heights for pine as determined by Minuse apply only to the quality of site for which the study was made. However, the majority of the mixed stands in the region are of this quality. An inspection in 1921 of a sample plot established by Minuse in 1914 showed his predictions of the growth of hardwood sprouts and of released pine on the area to be correct.

The most favorable age biologically may come before the pine has attained sufficient height to insure a permanent dominance over the hardwood element after the cutting, or before the hardwood is of sufficient size to be merchantable. If made at such a time the cost of

² A Study of the Effect on White Pine of Removing the Inferior Hardwood Overstory. Minuse, Harvard Forest, Petersham, Mass. (Unpublished.)

the disengagement cutting would have to be carried as an investment at compound interest until the time of maturity of the stand. If, however, the cutting be delayed until the product is merchantable for fuel wood, it can often be disposed of at a price which will cover the cost of the operation, thus obviating the necessity of carrying an investment charge. Not infrequently there may be a nominal profit in the sale of the hardwood. It is evident that there is a definite period of years in which, and in which alone, a benefit to the stand will result from such a cutting and in practice the one most favorable age will, in most instances, be determined by the financial return. For average conditions in central New England the period during which disengagement cuttings are possible is roughly from the tenth to the twenty-fifth year in the life of the stand and the most profitable age is the lowest age at which the hardwood product is merchantable, between the eighteenth and twentieth years on average sites.

FOREST REGION AND TYPE CLASSIFICATION FOR NEW ENGLAND¹

The purpose for which this regional and type classification is made is to establish a basis for studying the production of the forest areas in New England and for systematizing and standardizing silvicultural practice as applied on these areas.

Different ideas as to what constitutes a "forest type" are held by members of the profession. The committee wishes to avoid controversy on this subject and hence states specifically its conception of the terms "forest region" and "forest type" as used throughout this report.

The term "forest region" is understood to apply to any large area having throughout its extent the same general climatic characteristics, different from adjoining regions and with a distinctive forest cover.

In studying production and standardizing silvicultural practice, the forester must deal with the forest present on the area. Hence "forest type" for the purposes of this report is considered to be the cover type. This conception of forest type (that is, as the cover type) is defined by the Society of American Foresters in Forest Terminology, JOURNAL OF FORESTRY, Vol. 15, p. 80, as follows: "A cover type is a forest type now occupying the ground, no implication being conveyed as to whether it is temporary or permanent."

According to the classification and map issued by the U. S. Forest Service, entitled "Natural Forest Regions of North America," New England has part of its area in the central forest and the rest within the northern forest. This division does not accurately portray the forest conditions of New England. Hence the committee presents instead a separation into three natural forest regions as follows:

Northern New England.—The spruce and northern hardwoods region, characterized by beech, hard maple, yellow and paper birches, spruce, balsam fir, northern white cedar, tamarack, hemlock, and scattering white pine.

Central New England.—The white pine region; the transition belt between the hardwoods of northern and southern New England, characterized by white pine and a wide variety of hardwood species.

¹ Report by the Committee on Research, New England Section of the Society of American Foresters, March 12, 1921.

Names and Regional Distribution of the Forest Cover Types of New England.

Type	Forest regions		
	Spruce and north- ern hardwood	White pine	Hardwood
Cedar types.....	{ Northern white cedar swamp ² { Southern white cedar swamp ² { Red cedar ²		
Fir types.....	{ Fir flat ¹ { Fir slope ¹		
Hemlock types...	Hemlock ²		
Pine types.....	{ Pitch pine ² { WHITE PINE.....		
Spruce types.....	{ Old field spruce ¹ { SPRUCE FLAT..... { SPRUCE SLOPE..... { Spruce swamp or bog ¹		
Hardwood types.	{ GRAY BIRCH..... { NORTHERN HARDWOODS... { OAK..... { TRANSITION HARDWOODS.. { Birch and poplar ¹ { Hardwood swamp ¹		
Mixed types....	{ Pine and hardwoods ¹ { SPRUCE and HARDWOODS... { Mixed northern softwoods ¹		

¹Types of secondary importance.²Types of minor importance.

Regional occurrence of a type indicated by crosses (x).

Types of major importance commercially or in area occupied are written in capitals.

It is assumed that the mixed types contain (based on area occupied by the upper crown canopy) 20 to 80 per cent of conifers and 20 to 80 per cent of hardwoods; while the two types between which a given mixed type is intermediate contain less than 20 per cent of the conifers or of hardwoods in question.

Southern New England.—The hardwood region, characterized by oaks, chestnut, hickories, and yellow poplar.

For the purpose of studying production and standardizing silvicultural practice the cover type rather than the region should be the unit.

It is evident to one acquainted with New England conditions that instances are common of the same cover type occurring in two or more forest regions. The regional division, however, is not useless. It may appear on investigation that the same cover type requires different treatment and shows different production in each forest region.

A list of 21 cover types is submitted (p. 123). The committee has attempted to make the types as few as possible consistent with the range of conditions. The types as given in the table are divided into coniferous, hardwood, and mixed types. Their occurrence by forest regions is indicated. A separation into types of major, secondary, and minor importance is made.

TYPE DESCRIPTIONS

Northern White Cedar Swamp Type—

Composition—Cedar (*Thuja occidentalis*), spruce, fir, tamarack, yellow birch, red maple and black ash are chief species. Usually has an undergrowth of alders and a ground cover of sphagnum.

Origin—Chiefly seed in the original forest.

Location—Occupies sites with slow drainage and high water table but without peaty soil. Topography is flat and ground spongy.

Importance—Unimportant commercially or, except locally, geographically.

Southern White Cedar Swamp Type—

Composition—White cedar (*Chamaecyparis thyoides*) pure or in mixture with red maple.

Origin—Seed.

Location—Wet flat lands.

Importance—The type occupies a relatively small part of the area in southern New England as far north as Boston, but often contains stands of commercial value.

Red Cedar Type—

Composition—Red cedar (*Juniperus virginiana*) pure or with a small mixture of hardwoods.

Origin—Seed.

Location—Only on land once used for agriculture.

Importance—Type is of relatively small importance either commercially or in area throughout southern New England.

Fir Flat Type—

Composition—Balsam fir forms over 60 per cent of the stand. Spruce is found scatteringly.

Origin—Seed.

Fir Flat Type—Continued.

Location—On flats much the same in character as those of the spruce flat type. The type occurs following old blow-downs or on cutover river bottom lands and is chiefly of second growth character.

Importance—A type secondary in importance to the spruce types of northern New England.

Fir Slope Type—

Composition—Balsam fir.

Origin—Seed.

Location—On higher mountains above the spruce slope type and below timber line.

Importance—Frequently of scrubby character and poor quality. Most of the stands are unmerchantable. Occupies a relatively small per cent of the area in northern New England.

Hemlock Type—

Composition—Hemlock with admixture of other softwoods and hardwoods.

Origin—Seed.

Location—Cool sites; steep slopes and ravines in southern and central New England. Somewhat warmer locations in northern New England.

Importance—Of minor importance.

Pitch Pine Type—

Composition—Pitch pine pure or with a small percentage of oak.

Origin—Seed.

Location—Poorest and driest sandy soils.

Importance—Occupies a small percentage of the forest area in central and southern New England and is of minor commercial importance.

White Pine Type—

Composition—Eighty to one hundred per cent white pine with varying percentages of hardwoods, hemlock, pitch pine, red pine and red spruce.

Origin—Seed.

Location—Fresh to moderately dry, better drained sites. Invariably on cleared land or burn.

Importance—In central New England commercially the chief type, though exceeded in area by certain other types.

Old Field Spruce Type—

Composition—Second growth red spruce pure or with a small percentage of other conifers.

Origin—Seed.

Location—On lands at one time cleared for agriculture.

Importance—This is a northern New England type of minor importance as to area but per unit of area gives a high yield.

Spruce Flat Type—

Composition—^{northern hemlock + blueberry} Spruce, fir, and paper birch are principal species with spruce (red, black, and occasional white) forming 90 per cent of the stand.

Largely red spruce except where bordering on spruce swamp type.

Spruce Flat Type—Continued.

Ground cover is usually sphagnum.

Origin—Seed.

Location—Occurs on better drained flats and edges of lower slopes. The location is usually flat though there may be slight slope in any direction.

Importance—It is the third most important type commercially and geographically in northern New England, except in the mountainous portions.

Spruce Slope Type—

Composition—Similar to spruce flat.

Origin—Seed.

Location—Occupies upper slopes where soil is thin and slope steep to precipitous. Topography is usually broken and rough with protruding ledge and boulders.

Importance—Is important type only in mountainous sections of northern New England. The stand of conifers is sometimes heavy. Toward the upper elevations of the type the timber becomes short bodied, small and scrubby.

Spruce Swamp (or Bog) Type—

Composition—Spruce (black with some red), tamarack, and cedar, with sprinkling of black ash and paper birch. Often has heavy undergrowth of alders. Black spruce is predominating species. Growth is slow and development small.

Origin—Seed.

Location—Occupies poorly drained, low flat sites, with impervious soil of peaty character. The water table is high but the ground is less spongy than in cedar swamps.

Importance—Type is of minor importance commercially and geographically. Bog-grown black spruce yields heavily, however, in chemical pulp of very high quality. (Statement of H. B. Shepard.)

Gray Birch Type—

Composition—Variable mixture composed chiefly of such inferior species as gray birch, red maple, poplar and pin cherry, with a variety of better hardwood species.

Origin—Originates in some instances mainly from seed, in others from sprouts and root suckers.

Location—All sites and conditions common to the other hardwood types and also on poorer drier areas such as sand plains.

Importance—Important in area but not commercially, throughout central and southern New England.

Northern Hardwoods Type—

Composition—Chief species are: Beech, hard maple, and yellow birch. Small percentages of other hardwoods such as paper birch and red maple and of conifers such as red spruce, balsam fir, white pine, and hemlock, may be present.

Origin—Seed.

Ok. p. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

Northern Hardwoods Type—Continued.

Location—Well drained areas, usually sandy or clayey loam, all aspects, medium elevations.

Importance—In northern New England one of the chief types in area and commercial importance.

Oak Type—

Composition—Oaks, white, chestnut, red, black, and scarlet in mixture with chestnut, some hickory, and small percentages of other hardwoods.

Origin—Largely sprouts but contains some seedling trees.

Location—Well drained sites, all aspects and soils.

Importance—The chief type commercially and in area throughout southern New England.

Transition Hardwoods Type—

Composition—Red oak 27 per cent, white ash 15 per cent, red maple 15 per cent, basswood 9 per cent, yellow birch 8 per cent, poplar 7 per cent, chestnut 6 per cent, hard maple 3 per cent, paper birch 2 per cent, beech 2 per cent, miscellaneous 6 per cent. (Average of 40 sample plots taken by J. N. Spaeth.)

Origin—Both seed and sprout. Ninety per cent of type on cut-over land. Follows stand of same species or the clear-cutting of a pure pine stand.

Location—Better soils, fresh to moist, moderate slopes, benches, valley bottoms. All aspects within altitudinal limits from sea level to 1,500 feet.

Importance—Commercially second in central New England. Occupies a large percentage (30 per cent according to R. T. Fisher) of the forest area in central New England.

Birch and Poplar Type—

Composition—Mixed stands of poplar (*Populus balsamifera*, *grandidentata*, and *tremuloides*) and paper birch with a few other hardwoods. Usually has an understory of softwoods and may eventually revert to a softwood type.

Origin—Seed, although occasionally it may arise partly from root suckers and sprouts on cut-over land.

Location—Old burns and in some cases cut-over lands.

Importance—Of minor importance commercially and in area although it is the chief source of white birch spool-wood and of poplar pulp-wood.

Hardwood Swamp Type—

Composition—Red maple is the chief species with elm, black ash, yellow birch, a little sour gum, sycamore, and toward the north larch and spruce.

Origin—Largely sprout.

Location—Occupies moist to wet sour and peaty soils, in swamps, gullies, and small depressions of slow drainage.

Importance—A type of secondary importance.

Pine and Hardwoods Type—

Composition—Mixture of white pine and hardwoods, with occasional hemlock and spruce.

Pine and Hardwoods Type—Continued.

Origin—Largely seed.

Location—Well drained sites; same as those of white pine, and the various upland hardwood types.

Importance—Secondary in importance to the white pine and chief hardwood types.

Spruce and Hardwoods Type—

Composition—Red spruce is the chief species, with one or more species of the typical northern hardwoods in varying proportions. Frequently hemlock is present.

Origin—Seed.

Location—Sites intermediate between those of the northern hardwoods and spruce types.

Importance—Of large commercial and geographical importance in portions of northern New England.

Sub-types—The yellow birch type recognized in Maine is included as a sub-type under the spruce and hardwoods type.

Yellow Birch Sub-type—

Composition—A transition type between the northern hardwoods and various spruce and fir types. Yellow birch is the characteristic tree. Also contains some red maple, white cedar (*Thuja, occidentalis*), and occasional white spruce. Red spruce and fir compose up to 60 per cent of the total stand.

Origin—Seed.

Location—Lower slopes and well-drained flats. Soil has medium drainage less than in the northern hardwoods type.

Importance—Most importance type commercially and in area in northern Maine.

Mixed (Northern) Softwoods—

Composition—Spruce, fir, cedar, hemlock, and occasionally pine are mixed in such a way as to exclude the stands from any other type. A few poorly developed hardwoods may be present.

Origin—Seed.

Location—On poorly drained lands, but drier than the spruce and cedar swamps.

Importance—Commonly found in Maine but secondary commercially and in area to other types.

RECOMMENDATIONS

The committee recommends:

(1) Acceptance of the classification of types as herewith submitted as a provisional list subject to revision.

(2) That all members of the Section be furnished with copies of this type classification, be asked to suggest improvements and be urged to adopt so far as possible the classification in their work.

(3) That with this preliminary type classification as a basis, the Section encourage as projects of primary importance the work of
(a) ascertaining the production of the forest areas of New England;
(b) standardizing silvicultural practice.

Respectfully submitted,

R. C. HAWLEY, *Chairman*

E. I. TERRY

K. W. WOODWARD

The Committee on Research, New England Section of the Society of American Foresters.

RESERVATIONS TO THE COMMITTEE'S REPORT APPENDED BY
KARL W. WOODWARD

The following suggestion for modification of the committee's report is based on the feeling that the fundamental climatic and soil differences are not sufficiently emphasized. To bring these out more clearly it is suggested that the cover types be grouped under the following headings:

Hardwood.

Southern swamp.

White pine.

Northern hardwoods.

Northern swamp.

Northern spruce.

This plan should lead to greater clearness in valuation and growth prediction, the main objects of the formulation of forest types.

PUBLIC FORESTRY ON PRIVATE LAND¹

BY THEODORE S. WOOLSEY, JR.

SUMMARY

Forest devastation can probably be best stopped by direct Federal control; the second best means is by Federal co-operation with State agencies. But where unimproved forest land is neither being devastated nor intelligently managed there should be some method of State protection and improvement at the risk of the holder (not charging up anything for overhead costs). Such a scheme is illustrated by the following act, which provides: (a) For the protection, care and improvement of certain private land with and (in certain cases) without the application of the holder. (b) After a minimum period the holder may petition for the return of his property and receive it upon payment of costs not including "overhead." (c) Where the holder does not wish to pay for the costs, he will be paid the fair appraised value of the land less costs.

The idea of having the public practice forestry on private land is not altogether new. Under the Massachusetts forest laws (1908, 478, Secs. 1-8, as amended 1909, 214) provision was made "for the purpose of experiment and illustration in forest management" for the purchase and reforestation of private lands with the proviso that they could be repurchased by the legal owners within 10 years by paying the original purchase price plus moneys expended in improvements and maintenance with interest at 4 per cent. A somewhat similar arrangement has been used in France, notably in the Landes-Gironde and in the Alps, where private property if left to shift for itself, would become an economic loss or an actual menace to the public interest. The time is fast approaching in the United States when idle forest land will be a drag on local and regional prosperity. What are we going to do about it?

The Federal legislation thus far proposed to correct the evils of deforestation is directed at restraining and controlling private exploitation leaving the land in private hands. The controlling force is mainly Federal or mainly State with Federal cooperation. The stronger the Federal obligatory legislation, the better the result will probably be from the standpoint of the forester because nation-wide laws applicable to all States are the easiest to enforce and the most effective; but being

¹ Read before the Forestry Section of the American Association for the Advancement of Science, Dec. 28, 1921.

often more difficult to obtain, we may be forced to fall back on the second best measure obtainable under the existing conditions. If we fail to obtain drastic obligatory legislation to enforce forestry measures, then the States may consider various substitutes.

The bill that follows was devised by the writer and put into legal phraseology by P. P. Wells. It has never as yet been proposed as a State legislative measure but might prove a substitute scheme in States where direct purchases of private land for State forests could not be secured. The private holder says, "I can't afford to practice forestry." The State replies, "Yes, you can, and to prove the truth of our position, we'll take over your land for 10 years and show you." The sample legislation as now drafted provides for the protection, care, and improvement of private land by the State for a minimum area and for a minimum period, giving the holder the option to repurchase after paying the State its expenditures with simple interest, not including overhead. If the holder does not wish to repurchase, then the State pays the holder the net value of his land less costs, and it becomes a State forest. The law is based on the principle that the ownership of forest land carries with it the obligation to use the soil and not let it lie waste; that the State must step in where the private owner is unable to protect, administer, and improve his forest and the State assumes the financial risk. By this act the State is committed to a positive forest policy rather than to mere negative legislation. The proposed bill, as drafted in preliminary form, is presented to secure a discussion of the principles involved. To avoid pitfalls as to land titles the bill is so drafted that the State will deal with the land itself and with the person in possession, whether owner or not, leaving disputes as to ownership rights for settlement by private lawsuits.

SECTION 1.—Upon a finding by the State Park and Forest Commission, hereinafter called "the commission," made after due notice and hearing, that any piece of land in this State:

- (a) Is a contiguous parcel of 200 acres or more;
- (b) And is not suitable for tillage or orchard crops;
- (c) And is chiefly valuable for the growth of timber and wood;
- (d) And is not owned by the United States, the State or any town, incorporated city or borough within the State;
- (e) And is wholly or in part in the actual possession, joint or several, of some person (which word, wherever used in this act, shall be construed to include an individual, an association, a partnership, and a corporation) or persons designated, in such finding (the person or persons so designated, being hereinafter called "the possessor"); the Com-

mission may, upon the application of the possessor in such form as it may prescribe, take possession of such piece of land, publishing, in such form and manner as it may be general regulations prescribe, notice of such taking by newspaper advertisement, posting on the land and on the town sign post and recording in the town land records; and the Commission shall thereafter hold, protect, and manage the same as hereinafter provided for the growth of timber as trustee for the persons beneficially interested therein. And the Commission may do the like on its own initiative and without such application, upon a further finding by it, after such notice and hearing, that such piece of land:

(f) Is not being protected and managed with reasonable efficiency for the growth of timber and wood.

SECTION 2.—All such lands, while so held in trust shall be known as "auxiliary State forest lands," and shall be efficiently protected and managed by the State Forester, as the Commission shall direct, for the main purpose of growing timber and wood, and for other incidental purposes not inconsistent therewith. The Commission and the State Forester shall at any time have, for the effectuation of these purposes, all the rights, authorities, powers, duties and responsibilities, except the right to sell and convey the land, which they may then respectively have with respect to State forest lands, including the right to take the benefits of any present or future law for the taxation of woodlands and forests and the products cut thereon or taken therefrom.

SECTION 3.—The State Forester, under the control of the Commission, shall, in the protection, management and improvement of auxiliary State forest lands, use State moneys appropriated for that purpose in such manner as he shall deem most proper to secure in perpetuity the largest profit from the growth of timber and wood thereon in connection with other incidental use of the land.

SECTION 4.—The State Forester shall set up a separate account as to each tract of auxiliary State forest land taken into the possession of the Commission at one time from a single possessor or two or more joint possessors. He shall debit such tract with all State moneys paid for or credited on account of local taxes. He shall credit such tract with all receipts from the use thereof and/or from the sale of any products therefrom. For the unpaid balance, if any, at any time due on such account, with interest thereon at 4 per cent the State shall have a lien on such tract which shall be fully satisfied before any other claim whatsoever, except liens for local taxes given by existing law. Any timber, wood, or other products cut or removed from such tract, otherwise than by authority of the State Forester or of the Commission, may be seized by the State wherever found and after due notice may be sold by the State Forester, who shall apply the proceeds to the expenses of such seizure and sale, and the balance, if any, shall be credited to such tract.

SECTION 5.—After not less than 10 years and within 20 years from the taking of any tract into the possession of the Commission as

auxiliary State forest land, any person beneficially interested therein may petition the Commission for the termination of the trust and the conversion of all beneficial interests in such tract into such fee-simple or other titles and/or rights as the beneficiaries would then have if the land were not auxiliary State forest land. If, after due notice and hearing given and held in such form and manner as the Commission shall by general regulations prescribe, no person, other than the petitioner or petitioners shall have asserted any claim or right, the Commission shall, upon notice in like manner prescribed, declare that the trust created as to such tract under Section 1 of this act shall be at end upon the payment to the State by any person of the balance, if any, then due upon the account set up as to such tract under Section 4 of this act, together with interest thereon at 5 per cent per annum until paid. *Provided*, That unless payment in full of such balance with interest at 4 per cent shall have been made to the State Treasurer within one year next following the date of such declaration of termination of trust, then the State may foreclose its lien securing the same in like manner as liens for unpaid taxes may then be foreclosed, and upon the failure of all persons beneficially interested in such tract to redeem the same within the time fixed by the decree of foreclosure the absolute fee-simple title to such land shall vest in the State free of the trusts created under this act, and such land shall thereupon become State forest land. But if any person not a petitioner shall assert any right, title or interest the Commission shall proceed no further until such right, title or interest shall have been adjudged void by final decree of a court having jurisdiction of the matter.

SECTION 6.—At any time after the expiration of such period of 10 years and within 20 years any person claiming a beneficial interest in any tract of auxiliary State forest land may give notice in writing to the State Forester, in such form and to be served in such manner as the Commission may by general regulations prescribe, that such claimant renounces all his beneficial interest therein. The State Forester, subject to the approval of the Commission, shall appraise at its true market value such tract with the timber thereon and shall add such appraisal to the credit side of the account kept with respect to such tract and shall strike a balance of such account. If after due notice and hearing, given and held in such form and manner as the Commission shall by general regulations prescribe, no other person shall have asserted any right, title or interest in or to such tract or the balance, if any, to the credit of such tract, the Commission shall, by giving such notice as it shall have by general regulations prescribed, take absolute fee-simple title to such tract for the State, and shall pay to the claimant the balance, if any, then standing to the credit of such tract on such account. If upon such notice and hearing any other person shall claim any beneficial interest in such tract payment as aforesaid shall be made to the clerk of the Superior Court within and for the county wherein such

tract, or any part thereof lies, and the conflicting rights, if any, of all persons claiming beneficial interests in such tract and/or balance shall be determined by such Court to such effect and in such manner as equity and right require. Upon such payment to such clerk the Commission shall take absolute fee-simple title to such tract for the State. Upon the vesting in the State of title to any tract under this section it shall become State forest land.

SECTION 7.—Every person who shall cut, injure or remove any timber or trees on auxiliary State forest land, without having been first authorized by the Commission or by the State Forester so to do, shall be fined not more than \$1,000 and shall be fined in addition thereto \$5.00 for each tree wilfully cut.

The foregoing bill rests upon the following basic policy:

(1) The ownership of forest land carries with it an obligation to put the soil to a reasonably wise economic use. This obligation has been recognized by legislation during the development of a permanent forest policy by other nations. Where the public interest demands the protection or development of forest land, which the owner is unwilling or unable to effect, the State should have the right to take over the responsibilities and privileges of ownership.

(2) Land chiefly valuable for agriculture should be exempt from what amounts to expropriation. It must also be recognized that small parcels of land, too small to form an economic unit of management, must be left to private initiative.

(3) Since the legislation implies a public advantage in practicing forestry, the main financial responsibility should be assumed by the State, provided the inherent private equity in the property is not infringed upon. With increasing values for forest products a timber producing forest or a forest able to produce timber at a fairly definite date in the future is of more value to the State as well as to the individual. With the main burden of forest taxation deferred until the final harvest, forest property will tend to become more attractive as an investment especially when there is fairly sustained production with the consequent annual or periodic income.

With the legislation proposed enacted into law a great stride will have been made toward recognizing the real responsibility of forest ownership. What State will be the first to take the lead by passing this legislation, which will probably be falsely heralded in reactionary quarters as an attack upon private property.

THE PLACE OF UTILIZATION IN AMERICAN FORESTRY¹

BY NELSON COURTLANDT BROWN

Professor of Forest Utilization, N. Y. State College of Forestry

Forest utilization may be briefly defined as the profitable conversion of the forest crop from the stump to its final form and the efficient use of forest products. With about 80 per cent of our remaining virgin timber in private hands and a growing scarcity of wood products and a concurrent rise in values, even now only from 33 to 40 per cent of the wood in the trees which are actually cut in our American forests is eventually utilized, as lumber and only 17 to 18 per cent by our wood using industries according to several recent investigations. The remainder constitutes a great waste, necessary or unnecessary, which has been typical of American economic growth and development.

Is not this fact alone sufficient to justify serious thought along the lines of utilization for both the present and the future of American forestry?

For a long time the idea of scientific and efficient wood utilization has been singularly and notably absent from the usual definitions and professional acceptance of the term "forestry." Moreover the curricula of many of our forest schools have not been directed along lines commensurate with the importance of this phase of American forestry. Both our educational theories and much of our practice have been devoted along the lines of silviculture—the German and French applications of theories of production and management which apply to economic situations vastly different from our own. After all, is not forestry largely an economic question and is it not true that what can be done in utilization is the neck of the bottle through which all the rest of our forestry must be passed?

Far be it from me to minimize the importance of silviculture and other great branches of the subject, for it is understood that the initiation, tending, and protection of forest crops is vital to the best interests of our national welfare. However, in an economic situation such as

¹Read before the Forestry Section of the American Association for the Advancement of Science, Dec. 28, 1921.

we have, particularly in the United States and Canada, is not the extent to which we can practice silviculture almost wholly governed by the character and attractiveness of the market both present and prospective?

We have always been great users of wood. Our American civilization is literally founded on wooden homes and wooden structures of all kinds to a large degree. This is both logical and natural and an economic sequence of the fact that the abundant native forests immediately available at our doors have provided us with a cheap and suitable structural material.

Forest utilization, including the business of lumbering, the harvesting and use of forest products, is a branch of American industry whose possibilities along the lines of scientific efficiency in entering the present and future economic life of our nation, have scarcely been touched. A glance at what has been done for steel and other metals, textiles, oils, etc., by the formation of institutes of research such as the steel and iron institute and the petroleum institute illustrate by way of comparison how backward we have been in handling a commodity around which our lives revolve and are most closely associated than with any other commodity except food. Our present knowledge of air seasoning, kiln drying, wood preservation, etc., is still exceedingly meager. Our methods of distribution and of manufacture are woefully lax and inefficient. The public is still ignorant to a large degree of the use of wood as a commodity.

It has been estimated that improved drying methods would result in saving a billion feet, wood preservation as much as five billion feet, and as much more by efficient manufacture and careful saving at our mills.

Is not this subject, therefore, entitled to greater consideration? Should not our American forest schools be the proper place in which to give adequate and comprehensive training in this field?

With this condition in mind, is it not just as good business—for forestry must be considered as a business as well as an art—to secure more scientific and complete use of the wood now standing and being grown in our American forests as it is to initiate new wood growth by planting, by natural regeneration, by fire protection, etc.? Furthermore, is not the cultivation of the use of the lower grades of lumber in place of the better grades which are now becoming so scarce and expensive promoting the cause of good forestry?

In many countries of Europe from 85 to 95 per cent of all of the wood grown in their forests is utilized. Economic conditions obviously make this possible. Labor is comparatively cheap, markets are not far distant, and the problems of distribution and utilization are simple and of minor importance. In this country, however, conditions are vastly different and forestry is still in its infancy. Is it not apropos and opportune that in deciding upon a forest policy for the nation and in the training of more young men, to pay more attention to problems of utilization which face the country today as well as those 100 or 200 years hence? In this thought it is not advocated that we shall not provide for the future. The wastage and failure to scientifically use our American forest products constitutes a real and serious national problem.

Even with the great advance in price for lumber, the great problem is still the disposal of the lower grades. From 60 to 80 per cent of the total lumber production of our country is composed of the lower grades which are disposed of with great difficulty. Should not our American foresters take an active part in such moves as the standardization of grades, the education of the public to accept other than clear lumber for ordinary building purposes, and the promotion of better and more research along the lines of seasoning both by artificial and natural means, the preservative treatment of timbers, standardization of lumber sizes, etc.? In the United States we still adhere to the old-time demand for clear lumber, resulting in increased cutting of forests for high grades, commanding prices quite out of proportion to their economic usefulness while the lower grades can scarcely be moved to our markets and merchandized even at sacrifice prices. It is frequently the case that 10 to 20 per cent of our mill output must carry the burden of the lower grades. The lumber manufacturer looks for his profits out of a comparatively small portion of his output.

During the fiscal year ending June, 1921, the United States Forest Products Laboratory at Madison, Wisconsin, spent \$223,260 out of a total expenditure for investigations by the Forest Service of \$308,260. It would seem that this is a splendid recognition of the true value and comparative importance of the utilization of forests. The College of Forestry at the University of Washington has been turned into a College of Lumbering and Forestry. Harvard has special courses designed to prepare men for work in the lumber industry.

Many graduates of forestry schools are now using their training in successfully assisting lumber companies, pulp mills, railroads, timber treating plants, wood working industries, and many other users of forest products in the solution of their utilization problems. Many are successful secretaries of lumber and other organizations dealing in forest products. They are accomplishing these results by closer utilization of the raw material, by perfecting processes of manufacture, by finding uses for materials commonly considered as necessary losses and by spreading the gospel in many other ways. These men surely are practicing forest utilization and are contributing in a positive way to the solution of the forestry problems of this country.

Is it not time for all American and Canadian forest schools to recognize the greater importance of training men for the lumber and associated industries?

Hundreds of college men are yearly entering the lumber industry. Should not the forest schools be the place to educate these men who may not necessarily be foresters but who should be in an excellent position to spread the gospel of forestry after acquiring the proper viewpoint?

REVIEWS

Forest Mensuration. By Herman H. Chapman. John Wiley and Sons, New York City, 1921.

Forest Mensuration comprises 553 pages (including an index), 87 figures, and 89 tables. According to the author, "This text is intended as a thorough discussion of the measurement of the volume of felled timber . . . of standing timber . . . and of the growth of trees, stands of timber and forests." It is intended to replace Graves' Forest Mensuration, but is not a revision. It is divided into three parts as follows: (1) The measurement of felled timber and its products; (2) the measurement of standing timber; (3) the growth of timber. It is a fairly accurate presentation of the complex and difficult subject of forest mensuration. It contains practically everything of value that Col. Graves included in his original Forest Mensuration and in addition the results of mensuration research and development in the United States during the past 15 years. To be sure, there is nothing at all on the latest developments of estimating by airplanes, nor is the subject of stand graphics (as contrasted with stand tables) mentioned; nor could the alignment chart method of preparing tree volume tables originated by Prof. Bruce be included, since it is such a recent development. But this is only an illustration of the progress that is being made from month to month in the science and practice of mensuration in this country. A careful study of this text emphasizes the fact that American regulation is made unnecessarily complicated and involved (as compared with its European counterpart) because we have to deal with board feet, interpreted by multitudinous log rules each one differing from the other. It is possibly true also that we are more fastidious as to minutiae than they are in Europe, notwithstanding that the conditions in our forests are much more extensive. Frequently we are inclined to over-emphasize the necessity for accuracy because our foresters do not realize that the mensuration problem often calls only for an approximate answer to solve the problem. *Our tendency is to spend too much money for our answers, whereas a cruder method of solution would usually suffice.* This American weakness has perhaps influenced Chapman in adding material to the text that should have been omitted or at least relegated to the appendix.

This textbook is unquestionably an improvement on Graves' "Forest Mensuration." This was to be expected, for when Graves wrote his book, there was no American field practice tried out by hard usage. We had done a little timber cruising, valuation surveys, some simple stem analysis, and scaling. Consequently, it was but natural that Graves had to depend largely on European sources for the bulk of his material. Chapman has wisely eliminated much that was purely academic and of no value to the American forester. But even Chapman's book leaves much to be desired. He has digested, in intelligently arranged paragraphs, methods, for example, suggested by forest examiners and investigators, but is still under the disadvantage that these methods have not been proved by experience to be the best for the objective to be attained. One misses clear-cut conclusions as evidenced by paragraph 35. Chapman has sometimes been unable to separate the chaff from the grain in the great mass of forest mensuration methods developed by almost two decades of American forestry. As an ideal text book on mensuration, it is still too theoretical; it still contains in the text proper material that could be eliminated. Is it a practical guide in forest mensuration for the *woods forester* or a text book for students who must know a certain amount of conventional material? This brings up the question whether the student must be made to absorb all methods of doing a problem or only the best method to use with perhaps one alternative. This point in policy is illustrated by the difference between this "Forest Mensuration" and Cary's small pocket edition on forest surveying. Chapman has adopted the complex method, while Cary has largely simplified his text by basing it largely on his *conclusions* as a result of field experience. Chapman may be too academic for the practitioner, but Cary is too empirical for the student. There is grave doubt if any American forester or foresters could produce the ideal American Forest Mensuration today. Chapman's book is a step toward this ideal which has not been attained and could not be attained for another twenty years. This raises the question whether it should have been called "American Forest Mensuration" because of the vast amount of material it contains that applies *only* to the *United States*. Even granting that the ideal American mensuration text book is yet to be produced the title "*American Forest Mensuration*" seems more appropriate.

Let us consider some minutiae. The discussion of log rules, volume tables, timber estimating and growth, is extremely complete and space

has been economized by printing least important paragraphs in 8-point type and in placing in the appendix much that might have incumbered the text. There are few other foresters in the United States who could have equalled the accuracy and thoroughness of this text book, but in a book of this size it is obviously impossible to eliminate all minor errors or discrepancies. Let us examine some instances.

Par. 85. Scale Records. Judging from the sample scale given on page 100, these data on scale records is based largely on Forest Service practice. The last sentence of the second paragraph does not jibe with the first paragraph at the top of page 99. For example, it is stated, "The method of numbering is cumbersome where large quantities of very small logs are handled, but it is the only plan by which a uniform standard of scaling may be attained by a force of several scales." As a matter of fact, very small logs are usually not scaled by the Forest Service but are counted and lumped as one item on the scale book. This is borne out by Chapman's statement at the top of page 99 where he states, "If not numbered, they are checkmarked."

Par. 135. Measurements Required to Obtain the Volume of the Tree. Systems Used. The plan of giving three systems by which the volume of the tree can be obtained is excellent: (A) In 10 feet lengths from ground to tip; (B) from stump height to tip at intervals of 8 feet or a multiple of 4 feet; (C) by commercial log lengths as the tree is felled, allowing for trimming lengths. But in describing system (C) page 161, Chapman states: "Total cubic volume is obtained as accurately by this method as by System (A), and in addition, the data can be used directly to determine the volume in board feet. It is therefore preferable for most objects to System (A)." This paragraph is not clear nor is it accurate.

Par. 235. Combination Method Based on Sample Plots and Log Tally. The method described in the last paragraph of page 300 is not the only method nor is it necessarily the best method; this is an exceedingly important point because board foot estimates for valuable stumpage will in the near future be largely in board feet divided into quality lumber grades. To secure data by the so-called combination method, it would have been practicable to tally the logs of different grades for a certain proportion of the trees or for a certain proportion of the area, at the same time the regular strip survey was run. In other words, instead of laying out "sample or representative areas in the form of strips crossing the types as for timber estimating . . ." it should be possible to combine regular timber estimating with the operation of tallying logs of each grade. The form of tally referred to on page 301 (referring back to par. 207) is certainly inadequate for log tallying crews.

Par. 285. The Substitution of Curves of Average Height Based on Diameter for Actual Measurement of Height Growth. Every forester must realize that real height growth cannot be gauged by the height of trees of different diameters in bordering stands unless the age classes are known to be different and unless the average diameters of the dominant trees are first secured. As clearly stated (page 372) by Chapman. "Such a curve is not a growth curve at all, but a curve

showing the average heights attained by trees which may be all of the same age." Later on in the same paragraph on page 373, Chapman states, "Average height growth may be determined from the analysis of from 5 to 25 *average* or dominant trees with very satisfactory results," but since soil quality should be gauged by the height of dominant trees, it would appear dangerous to determine *average* height growth from the analysis of *average* trees, even if the proper proportion of suppressed, co-dominant, or dominant trees are included in the average. As explained elsewhere by Chapman, such averages that include suppressed trees are dangerous because the suppressed tree does not form part of the final stand. Probably this paragraph should be revised before the next edition is printed.

Par. 335. Use of Yield Tables in Prediction of Current Growth. One of the strongest features of the book is the emphasis against using current growth in forest mensuration, and as Chapman states in this paragraph, even current growth for short periods can best be predicted by the use of yield tables. Possibly there has been an over-emphasis by giving too much space to the description of growth of individual trees in diameter, height, and volume, and not quite enough emphasis on the use of yield tables for predicting growth of stands whether for short or long periods. Paragraph 229 on the use of ocular correction factors for volume is an interesting development of timber estimating largely developed by Chapman, but the paragraph is also an illustration of his tendency to complicate a comparatively simple mathematical problem. It is convincing, however, that the estimate of timber based on tallying can be made more accurate by ocular corrections, *especially in open park-like stands, such as the western yellow pine in Arizona. It might have been well, however, to have emphasized the difficulty of applying this method to dense stands of spruce or fir.* For example (page 336), how many foresters have determined the age of standing trees, even "provided the diameter is not too great," by an increment borer? According to paragraph 272, "The final expression of site quality is found in terms of total volume or rate of growth per year, of which *this* average diameter growth is one of the best indications." Later on in discussing height growth, Chapman himself makes it clear that site quality is best determined by the height growth of dominant trees (page 366), and in paragraph 296 Chapman states that "*typical dominant trees*" may serve as an indicator of site, and that "height alone is a reliable index of site quality, since it is affected but little by varying density or degree of stocking or by the treatment of the stand." Diameter therefore as an indicator of site is probably the least accurate factor. The wording at the end of paragraph 304 might be open to question. Speaking of normal yield tables, it is stated, "This function is better served if the standard of normality set by the table is not abnormally high, but is made to conform to the results possible of attainment on the average acre of the site class, with reasonably thorough protection from destructive agencies and reasonably full stocking." Many of our yield figures per acre have had to be discarded because only the best acres were measured, and the error was accentuated by taking very small plots in the best of the stands. On the other hand, the standard of normality mentioned by Chapman in the sentence just quoted might tend to confuse the student with the empirical yield table based on actual averages. Should not the word "reasonably"

be omitted? And should not the minimum area mentioned in paragraph 308 be larger than one-sixteenth of an acre? The minimum size cited should not have been less than one-fourth acre, even for dense young stands. In paragraph 309 also exception might be taken to the instructions in regard to height measurements for sample plots where it is stated, "The height of trees for a yield table should be taken separately on each plot. Several trees of different diameters, whose heights are average for the stand, should be measured and recorded together with their diameters" Do we want average heights for the stand? What we really want, as Chapman himself explains on the next page (400), is the height of dominant trees, or the dominant height of the stand. This point is further emphasized in paragraph 310, where he states, "These heights may be the heights of the dominant trees."

On pages 404-5 Baur's rule for the rejection of sample plots is, as Chapman states later on, probably too high a standard to justify the rejection of plots in our American forests. A 25 per cent abnormality should probably be allowed since the 15 per cent cited by Baur and Graves unquestionably applies to European conditions. In paragraph 314 the alternate method of constructing yield tables for mixed stands by combining the yield from pure stands is probably too artificial a method for accurate results.

The figures on the derivation of Pressler's formula are faulty but the equation can be readily corrected by referring to any standard mensuration. There are probably other errors such as this that escaped the notice of the reviewer that can be eliminated in the next edition. With the mass of data presented the book is accurate.

In a book of this magnitude and importance it is manifestly unfair to judge of the general value of the book by the absolute accuracy of each individual statement. Frequently opinion differs as to the correct answer, but on the other hand, it must be admitted that the really permanent text book is usually evolved and completed after it has been used by students and by the woods forester and after minor errors in wording have been corrected. Naturally this Forest Mensuration will not be an exception. While there are very few real errors, yet unquestionably Chapman will reword and modify a great many of the statements it contains, and possibly much of the discussion of log rules, etc., now included in the text will be relegated to the appendix, and perhaps more concrete illustrations will be added together with quiz questions and examples for the class room. There is, however, a counter-argument against including these additional data, namely, that the book is already too long; and the student will probably complain that certain portions are not clear, but it must be remembered that the subject of American forest mensuration is exceedingly complex and difficult and hence requires close study by the student coupled with the working out of practical examples. In some

cases the text book is complicated by giving exceptions to general rules too much prominence; exceptions should come at the end of a paragraph and be printed in smaller type *after the general rule or conclusion is first clearly stated.*

But we must not be too critical over minutiae. The text book will be a success. It is needed today by the profession and it is confidently predicted that it will take its place as one of the notable forestry text books of the United States. But one cannot help emphasizing again the unfortunate complication introduced into American mensuration by the necessary use of the board foot. The only development that will justify this complication will be when the high cost of stumpage justifies the operator in paying for a board foot estimate divided by grades or quality classes. When this development takes place our American mensuration will tend to justify the complication of estimating in the *final merchantable product.*

T. S. W., JR., AND R. Z.

L'Aménagement des Forêts par la Méthode Expérimentale et Spécialement la Méthode du Contrôle. By H. E. Biolley. Pp. 1-90. Attinger, Paris.

Biolley, who has had charge of fir-spruce forests in the Swiss Jura under intensive forest management, believes that the forest should be treated as an experimental plot and that the management should be based on a careful correlation of vegetative influences aimed at producing the greatest quantity of merchantable material without too strict an adherence to mathematical regulation. His philosophy distinguishes two types of forest management: one is imposed by a decree; the other is based on a series of experiments aiming at the best silvicultural and economic results. Students of European countries have often noted that the experimental forests under constant observation are often wonderfully managed. Biolley advocates just such intensive management for his rich forests of silver fir with short periods, frequent stock-taking, and frequent light fellings. Compartments, he argues, should not be larger than 30 to 40 acres. His calculation of growth is simply a comparison of two successive periodic inventories, taking into consideration the kind of trees cut. Instead of "sustained yield," he adopts the slogan, "increased yield," because his main objective is maximum growth. By using his silvicultural and management methods, he claims he can

produce *most of the best material in the shortest time*. While his ideas and methods are far too intensive for most conditions in the United States, they are, nevertheless, of interest to those engaging in very intensive silviculture, because he advocates many sound silvicultural and economic principles.

There is an interesting preface by Roger Du Camp, French Conservateur of Forests, who alludes to this work as being along the same lines advocated by Gurnaud, Biolley's predecessor, in urging such an intensive selective system. Biolley gives a theoretical exposition of his method and a detailed description of the process divided into: (1) Preliminary remarks, (2) the general procedure, (3) the period, (4) the general description, (5) compartments, (6) inventory, (7) control of felling, (8) calculation of growth, (9) the yield, (10) periodic recapitulation.

T. S. W., JR.

Regional Development of Pulpwood Resources of the Tongas National Forest of Alaska. By C. G. Smith, U. S. Department of Agriculture Bulletin No. 950.

Anyone who thinks that the Alaska Forests are locked up under the Forest Service administration should read this important and interesting bulletin, which aims at selling pulpwood from Alaska Forests to the manufacturer. Few people realize that 420,000,000 feet of saw timber have been sold from Alaska Forests during the past ten years, or that these Forests now contain 100,000,000 cords of timber suitable for newsprint and other grades of paper pulp. More important still is the fact that Smith estimates these Forests can produce 2,000,000 cords of pulpwood annually forever, or one-third our present requirements. The more important species on the Tongas Forest is western hemlock, 60 per cent; Sitka spruce, 20 per cent. The present water-power development, the bountiful supply of water and ocean transportation, moderate prices for the timber (without the carrying charge imposed by timber ownership) should induce timber operators who can command five to six million dollars of capital to pioneer in pulp manufacturing in Alaska. It is unfortunate that more extensive data on the timber resources are not available and that a more acceptable map could not be supplied. For example, the map on page 40 pretends to show "areas of best timber," but these are exceedingly difficult, if not impossible, to locate from the data at hand.

T. S. W., JR.

Afforestation in the United Provinces, India. By E. Benskin, Government Press, United Provinces, India. Pp. 1-31. Appendix, pp. 1-134. 30 illustrations.

Benskin give an interesting account of the effects of deforestation in arid British India. After reviewing the physical economic importance of forests, he gives in some detail the past and present policy of the British Indian Government toward forestation, the best methods and the expected financial results. The admirable illustrations are of great value for propaganda purposes in the United States if it is desired to show the disastrous results of deforestation in an arid country and the improvement of soil conditions after afforestation. It appears that the erosion of the Gangetic Plain has proceeded at an appalling rate and has resulted in increasing soil sterility, lowering the spring water levels, and has produced a more severe local climate simply and solely due to the wholesale clearance of natural forests. It is argued that the best way to deal with the problem is not by expensive engineering works but by the more natural means of forestation. Irrigation cannot solve the problem. An early report on the region by Brandis in 1879 advocated the exclusion of fire, the restriction of grazing, the prohibition of all wood cutting and filling up blanks by planting and sowing. Compared with the area to be reclaimed but little has been done to date. The methods used are somewhat similar to the practice in the French Alps, and the British have learned that the reclamation work is slow and expensive. The chief sources of revenue will be grass, timber, fuel, grazing and minor forest products. On flat lands the cost of plantations is about \$6 per acre with an annual cost of about 50 cents per acre per year in addition. Where land is ravined, the initial charge is almost doubled. While an attempt is made to show that at least some of the land will pay interest charges on the cost of afforestation, yet this appears extremely doubtful except on areas where Shisham timber can be grown. The plantation of Babul cannot produce sufficient revenue to even pay interest charges on the work. A remarkable series of three photographs showing Naini Tal before a land slide; after the China land slide of 1880 (where 150 persons were killed); and the same hillside in 1920, showing the result of planting and protection from grazing, are of interest to American foresters.

T. S. W., Jr.

Relations between Soil Type and Root Form of Western Yellow Pine Seedlings. By F. W. Haasis. Ecology, Vol. 2, No. 4. October, 1921. Pp. 292-303, 3 figures.

Much progress has been made in recent years in the working out of the general relationships which exist between forest vegetation and the complex of interacting factors which constitute the environment. Sufficient emphasis has not, however, been placed upon the characteristics of root systems, particularly initial root form and its relation to soil conditions. The paper under review presents the results of an attempt to correlate the habit and form of the root system of Western Yellow pine seedlings with varying soil conditions. The work was carried out near the Fort Valley Experiment Station in Arizona.

Observations extending over a period of two years were made upon 286 root systems, comprising six age classes and distributed over five soil types. The soil types are listed as loamy-rocky, stoney-clayey, gravelly, cindery, and clayey. These types, however, are inadequately described to give a clear idea of their physical structure. The root systems are grouped into eight categories based upon form and irrespective of age, as follows: Filiform, bifurcate, muscoid, obconical, clavate, fusiform, cylindrical, and ramified. It is to be noted that although eight form groups are distinguished the author states that a very constant general initial type of root system is apparent with a main vertical root and a number of laterals of different lengths and variously placed. The early tendency toward a pronounced tap root development is pointed out and the statement is made that the obconical is the normal form toward which the root systems tend, variations being due to inequalities of the soil. In the sandy and cindery soils a marked branchiness was found. The greatest length and depth of root appeared in the clayey soils, which is surprising in view of the relatively high resistance of clays generally to root penetration and their greater moisture content. No definite correlation was found to exist between the available growth water and the root form.

It is well known that the initial root-habit of any given species is an inherent character which is remarkably constant for a variable length of time after germination takes place. The form of the initial root varies within narrow limits when grown under variable conditions of soil moisture and soil composition. In time, however, which varies from a few weeks to a year or longer, depending upon the species,

the root system which was fixed at first, begins to assume various forms depending upon variations in the soil factors. Although the author found no apparent correlation between the form of the root and available growth water, it should be pointed out that the initial filiform tap root which grows rapidly downward at first and to considerable depth, is a correlation with soil moisture in that it is inherent in the species due to the complex of site factors of its particular range of which water is usually the limiting factor. It is not to be expected that variations in soil moisture as found in different types of soil of the same general locality will cause a difference in the form of the initial root, although the later form of the root may be influenced by it. While the form of the initial root is uniform for the species, the later development of the root system may be and usually is extremely variable due probably to the interaction of variable external factors. It is for this reason that the author found such a variety in the form of the root systems in the specimens examined that were more than a few months old.

On the whole there does not seem to be a sufficient basis offered by this rather restricted study for the differentiation of the classes of root systems noted. The fact seems to be overlooked that it is difficult to classify the roots of a single species as to form without reference to the age of the seedlings.

There is a relatively high degree of fixity in the initial root form of any species resulting from inherited characteristics arising from adjustment to environmental conditions, such for instance as moisture relations, and particularly the seasonal distribution of rainfall which is critical in Arizona. The tendency of the yellow pine is to produce an initial tap root of the shoe-string type which seems to be a general response to the rapid downward desiccation of the surface soil during the growing season. Later a diverse lateral system arises which tends to change constantly in form with varying conditions as age increases and finally the root system becomes predominantly lateral. The early lateral roots are mainly of a nutritive character and the lower roots adapted for water absorption. In cases where a branching of the tap root occurs, a form termed by Haasis, bifurcate, the structure appears to result more frequently from a biological accident such as an injury to the root tips rather than as a response to soil conditions.

This paper is an evidence of the growing appreciation on the part of silviculturists of the fundamental importance of the effect of the competition of roots for moisture and nutrients and the form of the

initial root habit as related to regeneration. In fact root competition, particularly in the semi-arid regions of the West may be a far more important factor than light relationships in the reproduction and development of stands.

A. B. C.

Preliminary Volume Tables for Second-Growth Redwood. Bulletin No. 334, University of California Press, Berkeley, Calif., 1921. Pp. 4.

Donald Bruce is the author of this volume table as of the one for white fir previously reviewed. Redwood has been treated like the proverbial red-headed step-child. Since 1903 no volume table covering this important species has been printed. Bruce here presents tables for second-growth trees from 7 to 30 inches d. b. h. and on two bases: Merchantable height by 16-foot logs ($1\frac{1}{8}$ to 6) and total height in feet (40 to 130). The former was prepared by the frustum form factor method; the second was derived from the first. Clark's International Log Rule is used as being more scientific and correct than either of those in local use—the Spaulding or Scribner Decimal C.

A. B. R.

PERIODICAL LITERATURE

FOREST GEOGRAPHY AND DESCRIPTION

Forests of the Kumaon Bhabar Gives a description of and the importance for grazing and timber production of the Bhabar forests growing on deposits of detritus along the foot of the Himalayas. Necessity for more intensive regeneration and artificial assistance to reproduction as well as closure to grazing emphasized. T. S. W., JR.

Smythies, E. A. *Note on the Miscellaneous Forests of the Kumaon Bhabar.*
Indian Forest Bul. No. 45, 1-22, 1921.

This forest, consisting of 50 per cent beech, 20 per cent oak, 15 per cent hornbeam, and 15 per cent other species, was formerly managed as coppice under standards with a rotation of 30 years. In 1860 its conversion into high forest was decided and a working plan prepared. The new rotation was set at 120 years with four periods of 30 years each and preceded by a transition period of the same length. Some underplanting of silver fir is now being done with a view to increasing the proportion of conifers. S. T. D.

Martin. *Forêt domaniale de Cherimont*. Bull. Trimest. Soc. Forêt. Franche-Comté et Belfort, 13:250-253, 1920.

This forest, composed of 37 per cent fir, 17 per cent spruce, 34 per cent beech, and 12 per cent other species, was managed until 1913 as a regular high forest with a rotation of 144 years. In 1913 steps were taken to convert it into a selection forest with the same rotation divided into 12 cycles of 12 years each. The annual yield is estimated at about 5 cubic meters per hectare. Previous cuttings of beech have been too heavy, and an effort should be made to maintain approximately the present proportion of this species.

S. T. D.

Demorlaine. *Forêt communale de Plancher-les-Mines*. Bull. Trimest. Soc. Forest. Franche-Comté et Belfort, 13:253-255, 1920.

BOTANY AND ZOOLOGY

Studies of Forest Types Björkenheim, working along the same lines as Cajander, presents the results of studies of more than 200 spruce stands in the mountain forests of central Germany. He classifies the stands on

the basis of the characteristic predominant plants in the surface vegetation (*Oxalis*, *Oxalis-Myrtillus*, *Aira*, *Myrtillus*, *Calamagrostis*). This vegetation, being a resultant of the various site factors, is a very good index of the wood-producing power of the site, as he shows by correlating height, diameter, and basal area growth of the spruce with the subtypes described. These different subtypes call for different silvicultural treatment. Rubner says that such conclusions are more applicable to the extensive virgin forests of Finland, northern Scandinavia, and northern Russia, than to the artificial forests of Germany where the natural vegetation has been greatly modified by neighboring cultivation of meadows and agricultural crops. Björkenheim's studies were made in the less disturbed mountain forests. Such studies of the forest vegetation are decidedly worth while because of the new points of view they afford, even though such positive results are those of Cajander and Björkenheim cannot usually be expected. W. N. S.

Rubner. (Review of: *Björkenheim.—Beiträge zur Kenntnis einiger Waldtypen in den Fichtenwäldungen des Deutschen Mittelgebirges.* Helsingfors, 1917. Forstwiss. Centralbl., 42:457-463, 1920.

SOIL, WATER, AND CLIMATE

Spring Frosts and Forest Growth Korstian furnishes valuable notes regarding the effect of the severe frost of May 31, 1919, upon the forest vegetation of the Wasatch Mountains of Utah. The vegetation at the time was abnor-

mally advanced due to an early and warm season with the mean temperature for May 5.3° F. above the normal. A minimum temperature of 15° F. was noted during the night of May 30 with a five-inch fall of snow. In the nursery it was found that the pines were in general uninjured but the spruces and firs were frozen in varying degrees wherever they had made any appreciable growth during the current year. It is of interest to note that Engelmann spruce grown from seed collected in Colorado had less than 10 per cent of the terminals frozen

while stock grown from seed collected locally suffered to the extent of 50 per cent. Little injury was noted under a light cover of hay, but canvas was less effective. The greatest injury in the nursery beds was upon the edges. Outside the nursery the native firs suffered more than the spruces, apparently due to their having begun growth earlier. The greatest injury was observed at elevations of 7,000 to 8,000 feet. The deciduous trees suffered more than the conifers. The aspens were completely defoliated, and partial leafing out again did not occur until late in the season. In many instances the growth not only of the current year, but of the preceding year as well was killed. A. B. C.

Korstian, C. F. *Effect of a Late Spring Frost Upon Forest Vegetation in the Wasatch Mountains of Utah*. Ecology, Vol. 2, No. 1, January, 1921, pp. 47-52, 1 fig.

SILVICULTURE, PROTECTION, AND EXTENSION

The Spessart oak is the most valuable product of German forestry. Its wood is in great demand for furniture and brings extremely high prices—9560 marks per cubic meter in 1920 for first-class material, and 6995 marks per cubic meter for all grades, as compared with 82 marks in 1901. Being grown on a rotation of from 200 years up to almost 500 years, the trees are exceptionally large and straight, with boles clear of branches for 20 to 25 meters and with a diameter of from 2 to 4 feet. The oak is usually started in pure stands, and underplanted with beech after it is about 100 years old. Another method is to start both oak and beech at the same time. Each method has certain advantages and disadvantages, but both have shown that the use of beech is absolutely essential for the best development of the oak, when grown on such long rotations. Silvicultural treatment of the stands is discussed in some detail.

W. N. S.

Vanselow. *Von der Spessarteiche*. Forstwiss. Centralbl., 42:345-353, 1920.

Since 1919 four parties of English forest students have visited the forests of Ecouves and Andaines. The climate here is particularly favorable for oak and beech, but the stands, as a result of former heavy cuttings, fires, and other abuses, are broken up and widely varied and in some of the worst places Scotch pine, silver fir,

and Norway spruce have been planted. In spite of the apparent complexity of the management, only two very simple systems are used: coppice and broadleaf high forests, or occasionally conversion into high forest. To enable the students to get the most out of their short visits, the forest conditions and methods of management are first explained to them and they are then shown the various treatments on the ground and are allowed to participate in whatever operations may be under way at the time. Particular emphasis is laid on the necessity of adapting the treatment prescribed to the climatic conditions and to the particular stand under consideration. Thus under the cloudy skies of Normandy clear cutting is successful in securing reproduction of oak since the seedlings, according to the theory of M. Roulleau, maintain themselves in the soil with roots full of sap, and start to grow only on the admission of sufficient light. No opportunity is lost to drive home the damages done by the war, even at some distance from the seat of operations, as a result of overcutting, failure to secure satisfactory reproduction, and the impossibility of making needed thinnings and other improvements because of lack of funds and labor. S. T. D.

Aubert, C.-G. *Visites de forestiers anglais dans les forêts d'Écouves et des Andaines*. Rev. Eaux et Forêts, 59:143-148, 1921.

The forest fire risk in Germany has increased considerably in recent years, due chiefly to the enormous consumption of cigarettes. Another frequent cause of fires is the habit of woodworkers of building fires to warm themselves, in or close to thickets of young growth. Fires in such places should be forbidden, and every forest tract should be insured against fire in order that the owner may not suffer loss if a fire should start. W. N. S.

Rosemann. *Vorbeuge vor Waldbrand-schäden*. Deutsch. Forstzeitg., 36:448-449, 1921.

A new tool for forest planting is described. It consists of a stout handle, terminating in three heavy iron wedges radiating out from a center, and so shaped that the center of the three-armed hole made by thrusting it in the ground is higher than the ends of the arms. It is especially adapted for planting such broad-rooted species as spruce. W. N. S.

Anonymous. *Das neue Kulturverfahren mit dem Dreiflügelpflanzstichel*. Deutsch. Forstzeitg., 36:453-454, 1921.

*Permanent
Canopy Forest*

In Saxony the great demand for timber, and especially for fuel-wood, is causing overcutting and may result in reducing the rotation to such a point that larger timbers are scarce. This may be remedied in pine forests by cutting about two-fifths of the volume, for mine timbers and fuel, at about half the rotation age, and underplanting with spruce, beech, and oak. The remaining pine trees should be left until this underwood is ready to cut, and should then be taken out along with the spruce, but the oak and beech should be left as a shelter for the new crop, because they require a longer rotation. In this way a mixed forest of several age-classes is maintained, and some timber of large size is produced.

W. N. S.

Reussner. *Zum Thema Dauerwald*. Deutsch. Forstzeitg., 36:536, 1921.

MENSURATION, FINANCE, AND MANAGEMENT

*Punjab Irrigated
Plantations*

The irrigated plantations in Northern India are to be managed as "self-contained forest estates on commercial lines." The most famous existing plantation and the oldest is that of Changa Manga near Lahore. The area is 9,605 acres, and in 1918-19 the net profit per acre was about \$9. Since there are some 62,000 acres suitable for such plantations, the financial possibilities are very great. They will probably prove even more profitable after adequate transportation is provided.

T. S. W., JR.

Grieve, J. W. A. *The Management of the Punjab Irrigated Plantations as Self-Contained Forest Estates on Commercial Lines*. Indian Forester, 47: 103-109, 1921.

Badré, who was French Forest Liason Officer *Forest Organization* at G. H. Q., A. E. F., in Chaumont during the *in Alsace-Lorraine* war, gives an interesting review of the German organization in Alsace-Lorraine before the war and the policy adopted by the French Government toward the organization problem now that the lost provinces are restored to France. He emphasizes the minutiae of the German administrative methods and lack of initiative on the part of the personnel. But it is interesting to note that the German policy of Government logging is to be maintained in

Alsace-Lorraine by France with the officer personnel largely reduced in the interests of economy. He emphasizes the skill of the Government lumber jacks who have been trained for years to cut under Government forest regulations. Minimum prices are established for the finished product, which cannot be sold, even at auction, for less than 10 per cent under the minimum prices. One important financial change is being made in that the forest officers now have no hunting privileges; instead these are leased as in other parts of France. Badré summarizes the advantages and disadvantages of Government exploitation as follows: (1) The middleman is obviated; (2) the purchaser knows exactly the quantity and quality of the products he purchased; (3) the exploitation is carefully carried out; (4) the detail of scaling and of administration imposes an immense amount of extra work on the forest officers; (5) the Government will be forced to take losses on account of future commercial crises.

T. S. W., Jr.

Badré, M. *Sur l'organisation forestière locale avant et après la guerre.* Société Forestière de Franche-Comte et Belfort, 14: 116-129, 1921.

Bengal Sal Data on results of ring counts of 100 Sal stumps. Bark thickness compared with diameter, taper curve showing relation between stump height and breast height, diameter—age, diameter of heartwood, length of merchantable bole for different ages, cubic feet—age, and thickness of bark for a given diameter, shown in 7 curves.

T. S. W., Jr.

Howard, S. H. *Rate of Growth of Bengal Sal (Shorea Robusta) 1 Quality.* Indian Forest Bul. No. 46, 1-19, 7 figs., 1921.

The State forest of Dabo has for centuries been heavily burdened by rights of user, and all attempts to extinguish these have been vigorously opposed by their possessors. Decided progress in this direction was, however, made in 1864, after a series of friendly negotiations, by the extinction of the rights formerly enjoyed by the residents of Abrechwiller and Voyer. In the case of the former 2,450 hectares of State forest were freed of all rights of user with an estimated annual value of 28,720 francs, while in return 515.4 hectares were set aside as communal forest. This forest has enabled the town, otherwise without resources, to turn over annually to every inhabitant

from 5 to 7 cubic meters (stacked) of firewood, and in addition has yielded it, on the basis of pre-war prices, an annual cash revenue of 20,000 to 40,000 francs. S. T. D.

Marcé, P. *Un cantonnement partiel des droits d'usage dans la forêt domaniale de Dabo.* Rev. Eaux. et Forêts, 59:206-213, 1921.

Receipts are set at 1,269,797,000 marks, of which 1,200,000,000 marks are for 10 million cubic meters of wood and timber. This is only 1 million cubic meters more than the working plans call for, while in 1920 the cut was one-third greater than provided in the plans, and receipts were considerably greater. Net income is estimated at 849,569,000 marks, which is 510,416,000 marks less than in the 1920 budget, because of a large increase in expenditures and a considerable decrease in income. W. N. S.

Anonymous. *Der Haushalt der Staatsforstverwaltung für das Rechnungsjahr 1921.* Deutsch. Forstzeitg., 36:545-549, 1921.

König describes a simple home-made hypsometer, which he says is just as satisfactory for most work as the most expensive one that can be purchased. It is based on the principle of similar triangles, and does not require measuring the distance from observer to tree. W. N. S.

König. *Baumhöhenmesser.* Deutsch. Forstzeitg., 36:493-494, 1921.

UTILIZATION, MARKET, AND TECHNOLOGY

The shortage of tanning materials in Germany during and subsequent to the war was partly met by the use of spruce bark. Trees cut during the winter must lie in the woods until May to be peeled, but this results in very serious attacks by borers, which greatly reduce the value of the wood. It will be necessary either to give up peeling winter-felled trees, or to find means to peel them earlier so that the wood will become dry before the first beetle broods emerge in March. W. N. S.

Dihm. *Ein Nachteil der Fichtenlohrindengewinnung.* Forstwiss. Centralbl., 42:399-401, 1920.

*Woods Used
For Pipes*

The annual consumption of wood in the United States for use in the manufacture of smoking pipes is nearly half a million feet, board measure. French briar represents over 66 per cent of this consumption. Only the root of the briar is used. Other species used are mountain laurel, applewood, and small quantities of red gum, birch, ebony, and olivewood.

J. K., JR.

Helphenstine, R. K. *Woods used in the manufacture of pipes.* Lumber 880:22, fig. 1-8, 1921.

*Spray Systems for
Pulpwood Piles*

Papers of Hoxie, Sutermeister, and Snell on this subject are reviewed. Systems installed by various paper companies are discussed, with advantages and defects noted. General recommendations based on the experience of these companies are made, covering the type and distribution of nozzles, methods of piping, cleanliness and pressure of water, and cost per nozzle. This latter item was based on the installation of twelve to fifteen nozzles per 100 cords of pulpwood and amounted to \$14 to \$17 per nozzle when first installed, but all material may be reclaimed each year with a cost of \$3 per nozzle for repiping.

W. H. S.

Mowry, C. W. Quarterly of National Fire Protection Association, 15: 120-124, 4 figs. 1921.

STATISTICS AND HISTORY

Forestry Abroad

The third French edition has just appeared of Fankhauser's "Guide to Silviculture," first published in German in 1866. This is a well illustrated, elementary, encyclopedic summary of the knowledge needed by forest officers. It covers the importance and general usefulness of forests, silviculture proper, forest technology, forest protection, and forest engineering. During the last century the area of the Belgian State forests decreased greatly. Out of some 53,000 hectares turned over to private owners, more than 20,000 hectares were cleared and the remainder much impoverished. These and other clearings were more than counterbalanced by the forestation of previously uncultivated lands, so that the forested area increased from 485,700 hectares in 1846 to 521,000 hectares in 1910, or 17.7 per cent of the total land area.

Damages to Belgian forests caused by the Germans during the war amounted to between ten and twelve hundred million francs, about half of which was direct. S. T. D.

Huffel, G. *Le mouvement forestier à l'étranger*. [Review of: Fankhauser, F. *Guide pratique de sylviculture*. Translated by M. Petitmerlet, published by Payot, 2, Place du Molard, Geneva, Switzerland, 348 pages, 121 fig., 1921. Also of Paskin. *Sylviculture et agriculture*. Annales des Gembloux, Feb., 1921.] Rev. Eaux et Forêts, 59:174-176, 1921.

Abnormal and exceptional prices for standing timber were obtained in France during 1920 which will be the high mark for many years to come, since the prices now have largely decreased; 140 francs per cubic meter for oak was considered high in 1919, but in 1920 in the forest of Bercé the price had risen to 200 francs per cubic meter. Of more interest in the United States are the prices for conifers. At Nancy the prices for spruce was 80 to 100 francs per cubic meter; at Besancon, 80 to 160; and at Vesoul, 90. Cordot attributes these abnormal prices to sudden after-the-war demand for timber in the devastated zone. Another reason is, of course, the depreciation of the French currency which resulted in higher prices for all necessities.

T. S. W., JR.

Cordot, E. *Les Ventes de bois en 1920*. Revue des Eaux et Forêts, 59: 109-115, 1921.

On account of the shortage of timber in France a conference was held June 22, 1921, to consider the exploitation of timber in French colonies. The depreciation of the French currency made difficult importation of timber from other countries, so that French timber merchants were trying to fill their timber requirements by importations from French colonies. Such exploitation was encouraged by the fact that timber imported into France was costing over 100 francs per ton and the conference reached the conclusion that "France can find in her colonies all the timber which she lacks." These enormous resources have never been accurately estimated, but are approximated (in million hectares) as follows: Gabon, 30; Cameroun, 12; Guyane, 5; Madagascar, 5; Indochine, 25; Nouvelle-Calédonie, 0.2. The above

does not include about 12 million hectares on the Ivory Coast. The conference was clearly an attempt on the part of the French Government to induce exploitation of these virgin colonial forests. T. S. W., JR.

Bertin, A. *Les Bois Coloniaux*. *Revue des Eaux et Forêts*, 59: 373-383, 1921.

POLITICS, EDUCATION, AND LEGISLATION

The law of August 5, 1920, made the agricultural colleges of the country civil bodies (*National School of Forests and Waters* ("persons")), and provided that in all their acts as such they should be represented by a director and administered by a council. These provisions should be extended to the National School of Waters and Forests, which is now nearly a hundred years old and which could make good use of the rights and privileges accorded by such a status. S. T. D.

Guyot, Ch. *Pour la personnalité civile de l'École Nationale des Eaux et Forêts*. *Rev. Eaux et Forêts*, 58:351-352, 1920.

MISCELLANEOUS

Bhola concludes that climbers and worthless species can be killed by "Atlas" preservative at a cost of about 16 cents per acre. "The whole height of the stump above ground should be painted to be certain of killing it. Trees and climbers should not therefore be cut more than one foot from the ground, the lower the better, to reduce the cost of the preservative." T. S. W., JR.

Bhola, M. P. *An Experiment with "Atlas" Preservative*. *Indian Forester*, 47: 422-423, 1921.

A new set of regulations governing hunting on the State forests was adopted April 4, 1921. Changes from the regulations of 1919 are described. The policy of universal State control has been adopted, with all receipts going to the Treasury, which bears all costs. W. N. S.

Anonymous. *Die neuen Jagdnutzungsvorschriften für die preussischen Staatsforsten*. *Deutsch. Forstzeitg.*, 36:509-511, 527-529, 1921.

American Affairs In the United States, forest destruction and failure to provide for a continuous supply of timber have created a roving and unstable lumber industry; have led to deserted towns, farms, and railroads, to local shortage of timber, and to speculation both in standing timber and in cut-over lands; and have prevented the development of permanent forest communities. These evils, some of which have not been unknown in France, can be corrected only by the adoption of a rational timberland policy, which will include land classification and public ownership and control, and which will result in a stable policy aimed at continuous forest production. Mr. Dana's views, which reflect the impression made on American foresters during the war by French forestry and particularly French silviculture, will surely be sympathetically received by Col. Greeley, whose choice as head of the U. S. Forest Service has been generally applauded by French foresters. S. T. D.

Mathey, Alph. *Choses d' Amerique*. Review of Dana, Samuel T., Forestry and Community Development. U. S. Department of Agriculture Bul. No. 638. 35 pages, Pl. 1-8, 1918. Rev. Eaux et Forêts, 59:269-279, Pl. 1-4, 1921.

The Lavender In the mountains of southeastern France lavender is a product of considerable importance to foresters. During recent years prices for essence of lavender have risen so greatly that its artificial cultivation has been undertaken. Yields vary from 5 kilograms of essence, worth 150 francs per kilo, in uncared for natural stands, to 24 kilograms per hectare in highly cultivated areas. France's total estimated production in 1912 was 60,000 kilograms, with England as its only serious competitor. The growing and harvesting of lavender provides quite an industry on lands otherwise unsuitable for cultivation, and it is an open question whether settlement in the mountains should not be encouraged by setting apart for this purpose certain of the better areas in the reforestation zones. S. T. D.

Moutte, V. *La lavande*. Rev. Eaux et Forêts, 59:11-18, 1921.

Haldu General description of tree, regeneration, properties of timber, uses, minor products, with chief sources of supply by provinces. T. S. W., JR.

Cox, C. E. C. *Note on Haldu (Adina cordifolia, Hook, f.)* Indian Forest Bul. No. 42, 1-23, 1921.

French Forestry
Victorious

American foresters in France at first chafed under the restrictions placed on their utilization of the French forests, which, with the enemy at the very gates, they felt should have been used without restraint. The Distinguished Service Medal should have been bestowed on the eminent French foresters who taught them the value of the French methods and who gave them an entirely new conception of forestry and of its application in this country. Col. Woolsey's book should be read by the directing class in America. It is indispensable for foresters and historians and of great interest to the general reader.

S. T. D.

Hill, Frederick Trevor. *La France forestière victorieuse*. Review (translated) of Woolsey, Theodore S., Jr. *Studies in French Forestry*. John Wiley & Sons, New York, N. Y. 550 pages, Pl. 1-21, 1920. *Rev. Eaux et Forêts*, 59:250-252, 1921.

Swiss
National Park

The Swiss National Park, comprising 14,000 hectares in the Engadine, was created through the efforts of the Swiss League for the Protection of Nature. Its purpose is not to serve as a mecca for tourists, but as a vast, open-air, scientific laboratory removed from the influence of man and devoted to the free development of vegetable and animal life. Hunting, grazing, and lumbering are prohibited. A Commission of Scientific Study has been established to observe and record all manifestations of nature in the park and, with the aid of a corps of Swiss naturalists, to publish monographs on its geology, fauna, flora, climatology, etc.

S. T. D.

Barbey, A. *Le Parc National Suisse*. *Rev. Eaux et Forêts*, 58:353-356, 1920.

Increasing
Yields

Gives data from article in *Frankfurter Zeitung* Supplement for March 6, 1920, regarding experiments by Riedel in fertilizing various crops with purified furnace gases (of which the fertilizing element is CO_2). It is reckoned that a daily output of 1,000 tons of iron produces enough plant food (gas) to grow 4,000 tons of crops such as potatoes, and enough gas is going to waste in Germany to supply the whole agricultural need.

W. N. S.

Anonymous. *Steigerung des landwirtschaftlichen Ertrages durch Hochofenabgase*. *Forstwiss. Centralbl.*, 42:382, 1920.

Experiments in Silesia A brief note gives the results of blasting stumps with 15 different explosives, at costs ranging from 13.28 marks to 63.82 marks per cubic meter.

The cheapest and most effective material was found to be a combination ammonal explosive. W. N. S.

Olbert. *Stubbensprengungsversuche der Forstabteilung der Landwirtschaftskammer Schlesien*. Deutsch. Forstzeitg., 36:536-537, 1921.

Semal or Cotton Wood General description of tree, regeneration, properties of timber, uses, minor products, with chief sources of supply by provinces. The timber is used for boxes and cases, planking, etc.

T. S. W., JR.

Cox, C. E. C. *Note on Semal or Cotton Wood*. Indian Forest Bul. No. 44, 1-31, 1921.

Odina Wodier General description of tree, regeneration, properties of timber, uses, minor products, with chief sources of supply by provinces. It is used as fodder and the bark contains 9 per cent of tannin and a coarse fiber suitable for "low quality ropes."

T. S. W., JR.

Cox, C. E. C. *Note on Odina Wodier, Roxb.* Indian Forest Bul. No. 43, 1-19, 1921.

Tricentenary of Jean de la Fontaine On July 8, 1921, was fittingly celebrated at Chateau-Thierry the tricentenary of the birth of Jean de la Fontaine, the immortal story-teller and poet. For twenty years la Fontaine was a special officer in the Administration of Waters and Forests; and in the woods, which he loved, he found the inspiration for many of his writings.

S. T. D.

de Lignières, H. *Le tricentenaire de la naissance de Jean de la Fontaine*. Rev. Eaux et Forêts, 59:233-238, 280-284, 1921.

NOTES

RESOLUTIONS BY THE NORTH CAROLINA FORESTRY ASSOCIATION

The North Carolina Forestry Association at a meeting at Wilmington, N. C., January 27, 1922, adopted the following resolutions:

1. *National Policy*

Whereas, The continued prosperity of this nation is dependent on the conservation and wise utilization of the forests, and

WHEREAS, Their perpetuation is threatened by the methods under which much of the forest is now handled, and

Whereas, There are now before the Congress several very far-reaching measures dealing with the disposition, regulation, improvement and management of the forests, both public and private, and

Whereas, we desire to inform our representation in Congress what is the attitude of this Association towards these measures;

Therefore, we herewith express our corporate opinion on these national measures as follows:

(a) We strongly condemn the movement to transfer some or all of the activities of the Forest Service from the U. S. Department of Agriculture, where it has been most efficiently administered during the past fifteen years, to the Department of the Interior.

(b) We heartily endorse the provisions of the several bills pending in Congress, which provide for extending the scope of the work of the U. S. Forest Service and increasing the appropriation for the prevention of forest fires in co-operation with the various States as authorized under the Weeks law.

(c) We urge the early passage of legislation by Congress providing an adequate appropriation, not less than \$1,000,000, for the continuance of the purchase by the Federal Government under the Weeks law of forest lands for the protection of the headquarters of streams and as a help towards a solution of our future timber supply problem.

(d) We congratulate the South and especially North Carolina on the establishment of the Southern Appalachian Forest Experiment Station at Asheville and the Southern Forest Experiment Station at New Orleans; and we hereby respectfully urge Congress to increase the appropriations for their maintenance so that they can more quickly and more effectively study the many pressing problems which Southern forestry is waiting to have solved.

2. We congratulate and extend thanks to the progressive members of the legislature of North Carolina at the session of 1921 in the enactment of a State-wide stock law. This legislation will not only encourage the production of more and better live stock and make agriculture more prosperous, but will permit more intelligent and rapid reforestation of our denuded lands. We urge upon the Governor, the judges and solicitors of our courts, and particularly upon the intelligent and progressive class of our citizens, an impartial and rigid enforcement of the stock law to the end that the people of the entire State may participate in its benefits.

3. The legislature of 1921 enacted a most important law authorizing the several counties by appropriation to co-operate with the State and Federal Governments in the protection of our forest areas. We urge the boards of commissioners of the several counties to take advantage of this law. No wiser investment of the public revenue can be made or one which will yield a larger dividend. We congratulate the people of those counties which have entered into this co-operative movement. Our remaining forests are amply worth protection.

4. As our forest lands contain mainly very young or very old trees, we therefore believe that the harvesting of mature timber should be so conducted as to leave uninjured the middle and smaller-sized trees. We urge that the present area of public forests, national, State, or municipal, be kept not only rigorously intact, but increased as rapidly and extensively as possible by purchase, gift or exchange.

5. We firmly believe that instruction in forestry should be given in all our agricultural schools and colleges and State universities.

Resolved, That we hereby express our deep appreciation to the Wilmington Chamber of Commerce, the N. C. Landowners' Association, the Wilmington Y. M. C. A., the press of Wilmington, and the court house and high school officials for their kind co-operation and many courtesies extended to our Association to make this meeting a success.

RESOLUTIONS ADOPTED AT THE ANNUAL MEETING OF THE MAINE FORESTRY ASSOCIATION

The Maine Forestry Association at its annual meeting, at Augusta, January 7, 1922, goes on record in the following resolutions:

First, Whereas, Forest fires continue to cause enormous and unnecessary destruction of mature timber and young growth throughout the

United States, and remain the most important deterrent to private owners who desire to undertake conservative methods of timberland management, and

Whereas, The prevention and control of forest fires has been developed as a well recognized and practical means of safeguarding our timberland resources from this danger, and is efficiently administered under governmental agency, be it

Resolved, That protection of forests from fire should be given the leading consideration in legislation and appropriations pertaining to forestry, both Federal and State; and be it further

Resolved, That the State of Maine should take immediate action to relieve the Forestry District from the serious situation caused by the present deficit, and enable it to enter the new year with unimpaired credit and without the handicap of lack of adequate funds, and be it further

Resolved, That the legislature of Maine should enact necessary laws to place the Maine Forestry District on a sound financial basis, which will prevent the occurrence of crises similar to that of the past year; and be it further

Resolved, That the legislative committee of this Association be instructed to consider and prepare recommendations providing for supervision by the Forest Commissioner of Maine of the work of forest fire protection on lands outside of the Maine Forestry District, and for appropriation by the State of ample funds for this purpose; and be it further

Resolved, That the legislative committee of this Association be instructed to consider and prepare recommendations for submission to the next legislature for revising and improving the forest fire laws of the State, in order that protection of our timberlands from fire may be more adequate than is possible under existing legislation.

Second, Whereas, The Secretary of the Interior has publicly advocated transfer of the United States Forest Service, in whole or in part, from the Department of Agriculture to the Department of the Interior, and whereas, this transfer is being considered by the Committee on Reorganization of the Federal Government, and

Whereas, The Maine Forestry Association feels that the proposed transfer would be a severe blow to the present high efficiency of the Forest Service, and would inevitably result in a loss of ground previously gained in the struggle for intelligent forest conservation, and

Whereas, The Maine Forestry Association further believes that the type of work done by the Forest Service allies it naturally with the Department of Agriculture, be it

Resolved, That the Maine Forestry Association expresses its strong opposition to transfer of any part of the Forest Service from the Department of Agriculture to some other department, and be it further

Resolved, That the Secretary of this Association be instructed to send copies of this resolution to the President and members of the Cabinet of the United States and to the Maine Senators and Representatives in Congress.

THIRD SOUTHERN FORESTRY CONGRESS

J. S. Holmes, the State Forester of North Carolina, Secretary of the Third Southern Forestry Congress, held at Atlanta, Ga., July 20-22, 1921, is to be congratulated on the excellence of his "Proceedings" and on their prompt publication. The proceedings contain a number of note-worthy articles, as, for example, "What Co-operation in Forest Fire Protection Means to Georgia," by J. G. Peters, who shows that the present area of forest land is only about 20,000,000 acres, "of which only 1,200,000 are left of the original *virgin* forests, and 6,300,000 are in cull forest and merchantable second growth." The remainder of 12,500,000 is in unmerchantable second growth or barren, and of this amount at least 5,000,000 acres is absolutely idle land. Col. Greeley, Chief Forester of the U. S. Forest Service, spoke on "Forest Resources and Opportunities in Georgia and Other Southern States," and shows that within 10 or 12 years the South will require the equivalent of practically its entire lumber output, and that in 25 years the South will have to import lumber for business and farm improvements. Greeley states, moreover, that "A recent survey of 5,400 sawmills in the Southern pine region shows that 82 per cent will have cut themselves out of raw material within 5 years and 97 per cent within 10 years." No wonder he signals the menace of idle lands, and the importance of organizing forest protection, the need for tax adjustment, and the extension of public ownership. "Forest lands," he states, "must be regarded as having the nature of public utilities." That is, that the public has a vital interest in the condition and use of forest lands. Other notable articles, all well worth reading, are "The Classification of Forest

and Farm Lands in the Southern States," by H. H. Bennett, who shows the vast amount of land suitable only for forestry, and "The Significance of Coniferous Softwoods in Regrowth with Special Reference to the Southern States," by J. W. Toumey, Dean of Yale Forest School. The Secretary is to be congratulated on the result of the Third Forestry Congress.

T. S. W., Jr.

A. NEW VARIETY OF BLACK JACK OAK

The black jack (*Quercus marilandica*) is one of the best known oaks in eastern United States. Throughout its range from New York to Florida and west to Nebraska and eastern Texas it grows in dry, thin, sandy or clay soils. Throughout this wide range it varies greatly not only in the size the tree attains, but also in the shape of the fruit and foliage. The typical form of leaf is thick, leathery, broadly obovate, and 3-lobed, or occasionally 5-lobed, the wide top end narrowing abruptly to a rounded or heart-shaped base; the upper surface of the leaf is a deep yellow-green and very glossy, in strong contrast with the rusty-pubescent under surface. The leaves vary in length from 12 to 17.5 cm.

My attention has been recently called to specimens of a form of this oak collected by W. W. Ashe, of the Forest Service, which grows from central Texas to Kansas. This form appears to be varietally distinct from the ordinary eastern type of black jack and I am here proposing for it the name *Quercus marilandica ashei*.

This variety differs from the type in its smaller leaves, which are seldom more than 8 cm., frequently less than 5 cm., long, the blades being broadly obovate, often 3 or 5 lobed, grayish pubescent beneath (chiefly in the axils of the veins) in place of the usual rusty pubescence, more slender twigs and smaller buds, smaller fruit, which is 15 to 18 mm. long, the ovate nuts being 10 to 14 mm. thick, and the cups being 11 to 15 mm. wide and 5 to 7 mm. high, rounded or flattened at base, with the small grayish brown or red-brown scales closely appressed in a thin edge and covering less than one-third of the nut. Fruit of the typical form is 14 to 18 mm. thick, and the cups are 15 to 20 mm. wide, mostly turbinate or hemispherical, pointed at base, while the scales at the thick edge are broad, truncate at the tips, squarrose, or loosely imbricate and cinnamon-red in color. This variety is the only form of black jack oak found throughout the plateau region of middle Texas,

where, in association with the post oak, it is very common, and from material in Mr. Ashe's herbarium and his notes this variety extends northward through middle Oklahoma to Riley County, Kansas.—Type W. W. A., from near Marble Falls (Smithwick), Burnett County, Texas, No. 1012.

GEO. B. SUDWORTH.

YALE FOREST SCHOOL GOES FORWARD

The Yale Forest School has been able to increase its resources for endowment and building during the past year to the extent of some \$600,000. This is due chiefly to the efforts of Professor Toumey who has been working for a number of years toward this end. It is also through the efforts of Professor Toumey that it was made possible for Colonel Graves to return to Yale at the beginning of the next collegiate year. It has been the desire of Professor Toumey for a long time to get Graves back but there were no available resources to make it possible. Recently, however, the school has been able to persuade the Corporation to grant \$250,000 in the form of a Sterling Professorship to the School of Forestry. This enables Graves to return, and gives a considerable fund for expansion in the work of the School. Colonel Graves will assume the duties of the Dean of the School on July 1. This will afford more time to Professor Toumey for special work along the particular lines in which he is interested. Foresters will look forward to important developments in the forestry work at Yale because of its greatly increased resources and particularly because of the splendid new building arranged especially for the needs of a forest school. Ground will be broken for this building with the opening of spring.

O. M. Butler, for the past five years Assistant Director of the Forest Products Laboratory, has accepted the newly-created position of Forester in the American Forestry Association at Washington, D. C.

SOCIETY AFFAIRS

THE ANNUAL MEETING OF THE SOCIETY

The annual meeting held at Toronto, Canada, December 27 and 28, 1921, was one of the best attended meetings of the Society. There were present 39 Senior Members, Members, Fellows and Associate Members of the Society of American Foresters, and 32 members of the Canadian Society of Forest Engineers. In addition, there were 30 guests who were not members of either Society. The total attendance was thus over 100 people.

Practically all of the papers presented at the meeting will appear in the issues of the JOURNAL.

Aside from technical papers there were submitted at this meeting the reports of the different standing committees. The most extensive report was that of the Educational Committee presented by the Chairman, Prof. J. W. Toumey. This report appears in this issue of the JOURNAL. The committee is to be continued.

The report of the Site Committee, presented by the Chairman, W. N. Sparhawk, was read and accepted and the committee continued on the condition that it be the last extension of time prior to the submission of a final report by the committee.

The report of the Committee on the Standardization of Forest Protection Measures and Equipment was presented by the Chairman, R. Y. Stuart, and accepted. This report is being printed in this issue of the JOURNAL. The annual report of the Member of the Executive Council in Charge of Admissions was read and accepted. This also appears in this issue of the JOURNAL.

The report of the Committee on Forest Taxation, of which L. S. Murphy is Chairman, was read and accepted with the understanding that the report be published and the committee continued.

Barrington Moore reported for the biological conference, composed of botanists, zoologists, ecologists, foresters and other workers in the field of biology which had just been holding a meeting in Toronto. Mr. Moore reported that this conference had arranged for another conference to be held in Washington in April, 1922, under the auspices of the Division of Biology and Agriculture of the National Research Council. On motion of Mr. Moore the President of the Society was in-

structed to appoint a representative of the Society to attend the coming conference. It was suggested that Dr. L. R. Jones, Chairman of the Division of Biology and Agriculture, should be notified of the appointment and that the representative appointed get in touch with him regarding the details of the meeting. Since presenting this proposal the President of the Society has appointed Barrington Moore as a delegate of the Society to this conference.

Mr. Moore also spoke of the representation of the Society on the Executive Council of the American Association for the Advancement of Science, stating that it was the desire of the Council to have the Society represented by some one who could be counted on to actually attend the meeting and thus give the Society a voice in the affairs of the Association. On this motion it was voted to request the President to appoint both a representative and an alternate in order to insure representation of the Society at meetings of the Executive Council and that the Permanent Secretary be notified of such appointment. The President has appointed Gifford Pinchot as the representative of the Society on the council and Col. W. B. Greeley as a substitute. This will assure representation at the future conferences of the council.

A letter was read from Dr. L. R. Jones, Chairman of the Division of Biology and Agriculture, National Research Council, reminding the Society of the fact that it is officially represented in the Division of Biology and Agriculture and that the present representative, Mr. Barrington Moore, goes out of office in July, 1922. It was voted that the President be authorized to appoint a successor to Mr. Moore and that Dr. Jones be notified of the appointment. The President has appointed Col. H. S. Graves as the representative of the Society in the Division of Biology and Agriculture of the National Research Council.

It was voted that copies of the resolutions relating to the proposed transfer of the Forest Service be sent to the President, to the entire Cabinet, to the Congressional Committee on the Reorganization of the Federal Departments, and to each member of Congress, with an appropriate letter of transmittal. It was also voted that the resolutions relating to the white pine blister rust and to forest research be transmitted to the Secretary of Agriculture and to each member of Congress.

It was voted that the next annual meeting of the Society be held in Boston in connection with the winter meeting of the American Association for the Advancement of Science, and the Committee on Meetings was instructed to make arrangements for the meeting. It was suggested that the Committee arrange the dates for the meeting

so that they would not come so close to Christmas, as was the case this year, and that the program for the meeting be arranged earlier and reduced to such compass that the papers finally included in the program could actually be presented and ample time for their discussion allowed. These suggestions were referred to the Committee on Meetings, as was also the suggestion by Mr. Woolsey that papers to be presented at the meeting be printed and distributed prior to the meeting to those planning to attend. The latter suggestion was referred to the Committee with the understanding that any expenditure of Society funds involved in such a plan be presented to the Executive Council for approval. Mr. Zon stated that it was estimated that the printing and distribution of the papers in this way prior to their appearance in the JOURNAL OF FORESTRY would cost approximately \$200 and that Mr. Woolsey had offered to make a personal contribution of \$50 toward meeting this expense, provided the plan were put into effect.

The desirability of holding Western meetings was also discussed and the Committee on Meetings instructed to arrange, in cooperation with the Western Sections of the Society, for a meeting to be held during 1922 in connection with the Pacific Section of the American Association for the Advancement of Science. Portions of a letter of November 1, 1921, from the San Francisco Convention and Tourist League offering the Society the free use of the Exposition Auditorium were read in connection with this discussion and the correspondence referred to the Committee on Meetings.

Attention was called to the balance of approximately \$1,000 now in the treasury and considerable discussion ensued as to the advisability both of setting aside certain funds to be used by the Executive Council in its discretion for the forwarding of important movements, and also of creating a permanent fund of which only the interest should be used for such purposes as might be approved by the Council. The following motions dealing with these subjects were finally adopted:

1. That the Executive Council be instructed to set aside at once as a permanent fund as much of the present balance in the treasury as it feels wise, and to add to this permanent fund from year to year as rapidly as possible.
2. That all members be asked to contribute voluntarily such sums as they feel able to the permanent fund thus created, and
3. That all members be asked to contribute voluntarily to a special fund which, in addition to such other balances as might be available, could be used at the discretion of the Executive Council to meet emergencies.

The following contributions to these funds were made at the meeting :

PERMANENT FUND.		EMERGENCY FUND.	
Francis Kiefer.....	\$5.00	Francis Kiefer.....	\$5.00
E. C. M. Richards.....	5.40	E. S. Bryant.....	5.00
Ellwood Wilson.....	5.40	Raphael Zon.....	5.00
E. S. Bryant.....	5.00		

Mr. Zon presented the project for the preparation of a forest dictionary in various foreign languages, the general policy of which had been approved by the Executive Council. On motion of Mr. Woolsey the President was requested to appoint a committee of five to handle the matter. During the discussion Mr. Ellwood Wilson suggested the possibility of using Esperanto in this connection.

The election of officers for the year 1922 was announced as follows :

President.....	E. A. Sherman
Vice President.....	H. H. Chapman
Secretary.....	W. N. Sparhawk
Treasurer.....	F. W. Besley
Member of Executive Council.....	R. C. Bryant

(For five years beginning January 1, 1922.)

RESOLUTIONS ADOPTED AT THE ANNUAL MEETING

Whereas, Independent of any plans for reorganization of governmental departments, bills have been introduced into Congress, namely, S. 2740, S. 2382 and S. 2203, which would transfer the United States Forest Service and the National Forests wholly or in part from the Department of Agriculture, under which they have developed their present efficient management; and

Whereas, The Forest Service is primarily concerned with the production of growing crops, which is a function of the Department of Agriculture; and

Whereas, The use and development of the National Forests and the furthering of forestry elsewhere in the country are closely co-ordinated with the work of forest investigations, insects, diseases, animal industry and plant industry, now in that department, so that these activities are a function of the whole Department of Agriculture and not solely of the Forest Service; and

Whereas, The Forest Service is developing rural community life both adjacent to the National Forests and throughout the country by cooperation with States in fire protection and under the Smith-Lever bill, and by encouraging forestry on farm woodlots, which constitute nearly half the forest area of the country; be it

Resolved, That the Society of American Foresters, representing the entire body of professional foresters of the United States, protests against the proposed transfer on the ground that it is opposed to efficiency and detrimental to the public welfare.

2. Whereas, The white pine blister rust threatens the continued production as a commercial crop of the white pines, the most valuable timber trees in this country; be it

Resolved, That the Society of American Foresters urges that every effort be made by public authorities and individuals to control and check the further spread of the disease, and specifically endorses the proposal to provide additional Federal appropriations of \$225,000 for demonstration, quarantine and other necessary control work, both in the East and West.

3. Whereas, The production and utilization of successive crops of timber can be handled effectively only when based on thorough-going, scientific investigations; be it

Resolved, That the Society of American Foresters urges the liberal support of forest research by the Federal Government, States, universities, and industries, and specifically favors increased appropriations for the Forest Products Laboratory of the Forest Service, and the establishment of an adequate number of Forest Experiment Stations, including the passage of the bills providing for such stations which are now before Congress.

4. Whereas, The present annual meeting of the Society of American Foresters has been one of the most profitable and enjoyable in its history, be it

Resolved, That we the visiting members of that Society, express our hearty appreciation of the hospitality extended to us on this occasion by our professional associates, the Canadian Society of Forest Engineers, and by the university authorities.

5. The Canadian Society of Forest Engineers and the Society of American Foresters wish to go on record that, while they recognize fire protection as essential to forestry practice, they believe that it is only one of the basic requirements of an adequate program. Such a program should aim not only to prevent forest devastation, but also to perpetuate without interruption supplies of desirable species of merchantable sizes. This can be accomplished only by including in the requirements silviculture, protection, utilization, and reasonable regulation of the cut.

REPORT OF THE SECRETARY FOR 1921

The membership of the Society is as follows: Fellows, 7; Senior Members, 397; Members, 208; Associate Members, 71; Honorary Members, 12; Corresponding Members, 2; making a total of 697. This indicates a very substantial growth in membership over that reported last year.

The election of officers and member of the Executive Council for the year 1922 brought the following results: President, E. A. Sherman; Vice-President, H. H. Chapman; Secretary, W. N. Sparhawk; Treasurer, F. W. Besley; Member Executive Council, R. C. Bryant.

PAUL D. KELLETER,
Secretary.

REPORT OF THE TREASURER FOR 1921¹

The Society is in somewhat better financial condition than at the end of 1920, with a balance of \$914.02, about \$116 in excess of last year's balance. The growth of the Society is reflected by an increase, for 1921 as compared with 1920, of about 35 per cent in both current dues and current subscriptions to the JOURNAL.

Through the generosity of Dr. Fernow, who has presented us with his remaining supply of copies of the *Forestry Quarterly*, the Society is the richer this year by \$54, representing the sale of back numbers of the *Quarterly*. There has been a decrease of nearly 24 per cent in receipts from advertising.

In preparing the budget for 1921 an average of \$562.50 was assigned for printing and distributing the JOURNAL. For the seven issues distributed to date the average cost fell below the budget estimate by 61 cents. Considering the somewhat larger number of cuts and tabular material that were included in 1921 and the larger number of pages for the first seven issues, this close approximation of the budget assignment is gratifying. In this connection it is interesting to note that the receipts from dues for the year 1921 exceeded the budget estimates by \$49.05, while those from current subscriptions fell below by \$30.28. It is believed that these close approximations to budget estimates indicate the value of the budget as a means of regulating and co-ordinating the finances of the Society.

¹ The Treasurer wishes to acknowledge his appreciation of the services of Miss Helen E. Stockbridge in keeping the accounts of the Society. Without the painstaking and accurate work of Miss Stockbridge the duties of the Treasurer, who was necessarily away from the office much of the time, would have been made very difficult.

It seems highly desirable, and action by the Society or by the Executive Council to accomplish this is strongly recommended, to set aside annually some part of our gradually increasing assets in the form of a sinking fund. Such a resource should undoubtedly be created as soon as our net receipts assume a safe margin (and it is believed that this point has already been reached) to cover any of a number of contingencies which will be likely to arise in future.

RECEIPTS.

Balance on hand January 1, 1921.....	\$838.07
Annual dues:	
1909-10	\$8.20
1919	10.00
1920	123.36
1921	2,474.05
1922	118.00
1923	5.00
1924	5.00
	<hr/> \$2,743.61
Subscriptions to JOURNAL:	
1920, Vol. 18.....	\$21.70
1921, Vol. 19.....	2,369.72
1922, Vol. 20.....	221.00
	<hr/> 2,612.42
Sale of back numbers:	
JOURNAL	\$158.45
Proceedings	39.65
Forestry Quarterly	54.00
	<hr/> 252.10
Advertising:	
By commercial institutions.....	\$117.50
By educational institutions.....	129.50
	<hr/> 247.00
Society pins	37.80
Miscellaneous:	
Interest on bank deposit.....	\$31.13
Refunds for illustrations used.....	51.69
Botanical abstracts (stamps loaned).....	5.00
	<hr/> 87.82
Total	<hr/> \$5,980.75
Grand total	<hr/> \$6,818.82

DISBURSEMENTS.

Publication and distribution of JOURNAL:	
Printing Vol. 19, Nos. 1 to 7.....	\$3,522.99
Line cuts and half-tones.....	110.99
Proofreading	175.00
Postage	109.57
Stencils	14.69
	<hr/> \$3,933.24

Miscellaneous:

Announcements of meeting.....	\$9.00	
Programs of meeting.....	77.63	
Ballots	20.00	
Nomination blanks	37.75	
Lists of candidates.....	109.95	
Members' address cards.....	4.50	
Letterheads	23.50	
Envelopes	15.85	
		<hr/>
		298.18

Stationery and postage (exclusive of JOURNAL):

Stamped envelopes	\$126.34	
Stamps	56.35	
		<hr/>
		182.69
Clerical and stenographic work.....		245.50
Addressing envelopes and folding.....		17.00
Telegrams		3.66
Express and freight.....		32.82
Society pins		37.80

Miscellaneous:

Cash book	\$3.25	
Filing case for cards.....	1.50	
Repairs and ribbons for addressograph.....	3.44	
Loan to Botanical Abstracts for stamps.....	5.00	
Duty on book from England.....	.85	
Refunds on dues and subscriptions.....	9.00	
Folders for letter files.....	4.50	
Multigraphing	7.50	
Dr. Fernow (<i>Quarterlies</i> sold in 1920).....	75.25	
Overcharge by bank on returned check.....	5.00	
		<hr/>
		115.29

Total		\$4,866.18
Balance on hand.....		1,952.64
		<hr/>
Grand total		\$6,818.82

ASSETS.

Balance on hand.....	\$1,952.64
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Annual dues:

20 at \$5.....	\$100.00	
5 at \$4.....	20.00	
		<hr/>
		120.00
Sales of back numbers.....		9.90
Advertising		85.00
Refund for illustration.....		15.00
		<hr/>
Total		\$2,182.54

LIABILITIES.

Dues paid in advance.....	\$128.00
Subscriptions paid in advance.....	221.00
Clerical and stenographic work.....	58.50
Postage and express.....	10.50
Printing and mailing Vol. 19, No. 8.....	686.73
Manila envelopes	135.75
Proofreading	25.00
Line cuts	3.04
Total	<hr/> \$1,268.52
Excess of assets over liabilities.....	<hr/> \$914.02

E. H. FROTHINGHAM, *Treasurer.*

Audited and found correct by C. R. TILLOTSON.

REPORT ON ADMISSIONS

NEW MEMBERS

During the past year 131 persons were elected to membership in the Society. This number includes 81 Members, 41 Senior Members, 1 Fellow, 6 Associate Members, 1 Honorary Member, and 1 Corresponding Member, as follows:

MEMBERS

Abbott, Arthur H.	Hicks, P. R.	Miller, Edwin B.
Adams, John A.	Hill, W. F.	Morris, W. W.
Ade, H. G.	Hogeland, Charles C.	Munro, Robert
Anderson, Parker O.	Hopson, Raymond E.	Neff, Philip
Bearer, Valentine M.	Horton, F. V.	Newlin, John A.
Brooks, James F.	Hunt, George M.	Perry, Walter J.
Brown, Fred E.	Hurt, Leon C.	Phillips, Roy A.
Brown, Harry P.	Jefferson, Frank J.	Rhinehart, R. F.
Burris, M. M.	Jensen, J. C.	Riley, James E., Jr.
Carroll, Francis T.	Jones, G. W.	Roberts, Paul H.
Clark, B. W.	Jones, John D.	Ryan, J. E.
Clark, E. V.	Kerr, John	Salton, Robert C.
Coan, Hamilton M.	Kimball, George W.	Shaw, Arnold C.
Conklin, W. Gardiner	Klobucher, Frank J.	Stoneburner, W. H.
Cope, H. Norton	Lang, Duncan M.	Strickland, Simeon
Cunningham, Russell N.	Lansing, Harold H.	Swim, C. B.
Cuno, John B.	Lay, J. H.	Taylor, John B.
Davis, H. S.	Lee, I. Laurence	Ten Eick, Charles W.
Drake, Howard	Leete, Bernard E.	Thelen, Rolf
Dubuar, James F.	Leighou, John V.	Warren, M. C.
Filler, Edmund C.	Lodge, L. Van A.	Webb, C. S.
Forsling, Clarence L.	Long, W. H.	Wells, S. D.
Cheen, Russell T.	Makibbin, C. F.	White, Wellington
Gisborne, Harry T.	Matz, Fred A.	Wilson, T. R. C.
Hadley, Evan W.	McKee, E. R.	Winn, Frederic
Hartwell, Edward W.	McLaughlin, R. P.	Wise, L. W.
Hawley, Lee F.	Merkle, Fred	Wolfe, Kenneth

SENIOR MEMBERS

Arrivee, David A.
 Avery, B. F.
 Bailey, H. V.
 Bishop, Oliver F.
 Clark, R. E.
 Cope, J. A.
 Dague, William F.
 Eaton, C. W.
 Emerick, R. Lynn
 Fahrenbach, J. H.
 Gould, C. W.
 Hamel, A. G.
 Hubert, E. E.
 Keller, John W.

Knapp, M. Donald
 Levison, Jacob J.
 Lindsay, E. L.
 Lowdermilk, W. C.
 Ludwig, Walter D.
 Martin, Dean W.
 Meek, Charles R.
 Montgomery, William E.
 Moss, Albert E.
 Mulford, Paul H.
 Neefe, Robert R.
 Perry, George S.
 Ramsdell, Willett F.
 Record, Samuel J.

Reed, Franklin W.
 Richards, E. C. M.
 Rupp, Alfred E.
 Schwab, W. B.
 Staebner, Ralph C.
 Staley, Lewis E.
 Stickney, Mallory N.
 Sweet, C. V.
 Tinker, Earl W.
 White, Wilfred W.
 Whitham, J. C.
 Winter, Raymond B.
 Yeomans, Edward J.

FELLOW

Toumey, James W.

ASSOCIATE MEMBERS

Adams, R. B.
 Colby, Forrest H.

Fox, J. W.
 Hensel, R. L.

Ingalsbe, F. R.
 Lowell, John W.

HONORARY MEMBER

Antoni, Paul

CORRESPONDING MEMBER

Smitt, Anton

Of the men listed above under Members, 4 who were proposed for Senior Membership are still under consideration for that grade. In addition 58 candidates for Membership, 11 for Senior Membership, and 4 for Associate Membership, chiefly those included in the list of Oct. 1, 1921, are now under consideration by the Council.

The ratio of Members to Senior Members continues high. In 1920 it was 4.4 to 1, while in 1921 it was 2 to 1. This is, of course, natural and indicates a healthy condition. It is, however, only during the last two years that the ratio has prevailed. This is brought out clearly by the following tabular summary of elections since the membership provisions of the Constitution were revised:

Grade	1917	1918	1919	1920	1921	Total
Members	0	3	35	159	81	278
Senior Members.....	0	40	36	36	41	153
Fellows	0	6	0	0	1	7
Associate Members.....	0	6	14	7	6	33
Honorary Members.....	0	0	0	2	1	3
Corresponding Members.....	0	0	0	2	1	3
Total.....	0	55	85	206	131	477

From now on the majority of candidates will, undoubtedly, enter the Society as Members with the prospect of being advanced to Senior Members as soon as their achievements in the profession warrant the promotion. In this connection care should be exercised by the membership generally to see that men are not allowed to stagnate in the lower grade.

Responsibility for this rests primarily on the Sections, which now cover the country pretty thoroughly and which should periodically review their lists of members to determine whether they are in the appropriate grades.

There is an increasing tendency to admit as Members non-forest-school rangers, deputy supervisors, and supervisors of long and creditable experience. This tendency is much more marked in certain parts of the Society, particularly in the Missoula, Southwestern and California Sections, than in others. The Council sees no objection to the admission of such men provided that care is taken to select only those of considerable experience and outstanding ability who clearly qualify as "foresters."

For the first time non-forest-school men whose work lies in the field of forest products have been admitted to the Society. The Council has thus recognized that men engaged in forest and wood utilization are eligible for membership on the same basis as those engaged in forest protection and forest production. Here again the crucial point is whether they qualify as "foresters," under the Council's definition of that term.

FELLOWS

The Society showed itself to be extremely conservative in the election of Fellows. After prolonged, and at times somewhat heated, discussion of the subject the names of thirteen candidates, one of whom had been nominated by the Executive Council and twelve by petition, were submitted to the membership for letter ballot.

With 68 per cent of those entitled to vote actually participating in the ballot, the vote was unusually large and decisive. Only one candidate received the three-fourths vote necessary for election. Of the rest, only two received more than half of the total vote cast and eight received less than one-third. The fact that this result occurred after the entire question of Fellowship had received such widespread and thorough consideration makes it clear that the Society as a whole desires to maintain the high standard previously set for the grade

and to make it a real honor by electing to it only those whose position as leaders in the profession is prominent.

In order to obviate the criticisms made during the past year as to the previous handling of Fellowship nominations, the Executive Council has adopted a procedure which will insure systematic consideration of the matter. According to this plan the Council will determine each year whether it cares to make any nominations for the grade, and will notify each Section of its decision. Ample time will then be allowed for such additional nominations as the membership generally may care to make through the written endorsement of twenty-five or more Senior Members or Fellows.

A recent canvass of the Executive Council in accordance with new procedure has indicated that it does not care to make any nominations for Fellowship at this time. All of the Sections have been notified of this decision, which is hereby announced to the membership generally, with the request that any nominations by petition which it may be desired to make be submitted if possible by May 1.

The Council has also considered the various suggestions that have been made from time to time for the amendment of the present Constitutional provisions relating to Fellows. Its conclusion is against recommending any change. The Council feels that the last election demonstrated conclusively that the good sense of the Society as a whole can be relied on to maintain the present high standing of the grade without imposing further Constitutional restrictions, and that the present procedure for securing systematic consideration of the matter makes unnecessary any rigid requirement for annual nominations. If there is any general disagreement with this point of view, it is suggested that steps be taken to bring the matter before the Society by petition. While the Constitution does not prescribe how amendments may be initiated, the Secretary would doubtless be glad to present for ballot any proposed amendment having the written endorsement of at least twenty-five Senior Members or Fellows.

CORRESPONDING MEMBERS

The grade of Corresponding Membership has now been in existence for more than two years. During that period only three persons have been elected, to wit—one from France, one from British India, and one from Norway. While the Council has always expressed the belief that the number of members in this grade should be kept comparatively small, it is inclined to think that the present tendency is to go

too slow rather than too fast in their election. As the interests of foresters become more and more international in scope, it will be increasingly necessary to have reliable and sympathetic points of contact with other countries. Can not these be supplied to advantage by adding to the Society as Corresponding Members more foreign foresters who will take a real interest in our activities and in turn will help to keep us in touch with forestry activities abroad?

MEMBERSHIP PROCEDURE

Criticism has occasionally been voiced at the delay in securing final action on nominations. To a considerable extent such criticism is justified, particularly from the point of view of the critic. Both the member of the Council in charge of admissions and other members have not infrequently been guilty of undue delay in handling membership papers. On the other hand it must be remembered that the procedure prescribed by the Constitution is at best cumbersome, and that to pass fairly on proposed members involves much painstaking work on the part of ten busy men scattered from one end of the country to the other. Moreover, attention should be called to the fact that in spite of all delays, both real and alleged, more men are now being admitted to the Society than ever before. Thus, during the past three years 422 members of all grades were elected as against 83 during the preceding three years while during the last two years 337 were elected as against 168 during the preceding four years. It can also, I think, be safely said that the qualifications of each man are now more carefully analyzed and considered than ever before.

The standard procedure at present followed in the handling of elections was described in some detail in my last annual report in the February, 1921, issue of the JOURNAL OF FORESTRY. The practice has now been established of issuing annually two lists of candidates, although the date of their appearance has so far been somewhat irregular. Hereafter it is planned to issue such lists in January and July, or as soon thereafter as possible. Barring accidents, this will allow ample time to pass on candidates so as to make their election effective at the beginning of the succeeding July or January. The new blanks for submitting nominations which have been printed and distributed during the year will, if generally used, save much time for both endorsers and Council, and will considerably facilitate the handling of elections. Members are reminded, however, that when only two lists of candidates are issued each year, speedy action cannot be expected.

The machinery is now working with reasonable smoothness, and if they will be patient they may rest assured that action will be taken in due course.

MEMBERSHIP POLICY

No changes have been made in the membership policy of the Council as presented in detail in the February, 1921, issue of the JOURNAL.

In regard to the two points on which comments were requested at that time, the Council has agreed (1) that men who are not forest school graduates and who are engaged in a line of work not dealing directly with forest production, such as logging engineering, forest products and city forestry, are eligible for Membership provided they qualify as "foresters"; and (2) that men may be nominated for Membership immediately on the completion of a four-year course in forestry, without being required to spend an additional year in study or practical work. Under the present procedure of issuing lists of candidates in January and July, or thereabouts, this latter ruling makes it possible for a man to join the Society within approximately six months after leaving school.

The Council believes that its membership policy has finally after more or less experimenting, become crystallized into definite, workable and reasonably satisfactory form. In the absence of criticism, it assumes that this policy also meets with general approval. In its judgment what is now needed is a concerted effort to bring into the Society every one eligible for either Membership or Senior Membership in it. This includes all "foresters" engaged in "forest work." Unfortunately there are many such men who are still outside the fold. The Society needs their active support, while they in turn need to belong to the only nation-wide, professional organization of foresters in the country. Every forest school and every Section should feel a personal responsibility to see that their graduates, or foresters within their jurisdiction are members of the Society.

S. T. DANA,

Member Executive Council in Charge of Admissions.

NOTE.—The following men have been elected to Associate Membership, effective February 1, 1922: J. Lewis Thompson, Houston, Texas; Neil L. Violette, Augusta, Maine; Frank A. Waugh, Amherst, Mass.

REPORT OF THE COMMITTEE ON STANDARDIZATION OF FOREST FIRE
PROTECTION MEASURES AND EQUIPMENT

HARRISBURG, PA., *December 20, 1921.*

On behalf of the committee appointed January 17, 1921, to "study the question of accomplishing a standardization of forest fire protection measures and equipment," I desire to submit the following report:

SCOPE OF STUDY

After considering the wide field presented by the assignment, the committee concluded that it should confine its investigations for the present to the following important forest fire protection measures:

(a) Methods now used in reporting and compiling statistical data of forest fires.

(b) Methods now used in estimating damage caused by forest fires.

(c) Accepted bases of measuring adequate protection of forests from fire.

A questionnaire was sent to all State and other prominent forest fire organizations with the request that they supply data pertinent to the subjects under the following headings:

1. Rules for the appraisalment of damage from forest fires, including damage to
 - (a) Merchantable timber.
 - (b) Unmerchantable timber.
 - (c) Young growth.
 - (d) Forage.
 - (e) Humus or ground cover.
 - (f) Productive capacity of the land.
 - (g) Any other values considered.
2. A copy of the form in use for reporting the details of forest fires.
3. The form in which forest fire statistics are recorded.
4. The principle followed in forest fire protection, that is, what is considered adequate protection in terms of acres burned per year in relation to total acreage of forest land protected, and the estimated annual cost per acre to secure such protection.
5. The average annual acreage burned, the total acreage of forest land protected, and the average annual cost of protection.

Replies were received from most of the organizations addressed. The data furnished by them form the basis for this report.

THE FOREST FIRE REPORT

It is clear that the forest fire report submitted by the field officer constitutes the medium through which data in standardized form must be secured. Field officers submitting these reports vary greatly in ability and experience in forest work, so that the method of reporting should be made as simple as possible. The need for such simplicity has led to the use of local terms for class of area burned and of material damaged, with a consequent wide variance, noticeable particularly in the large number of synonyms used for large and small forest growth.

Terminology

The large forest growth is termed "merchantable timber" in Pennsylvania and Minnesota; "mature timber" in Maryland and Texas; "merchantable woodland" in Connecticut; "timberland—trees large enough for lumber" in Massachusetts; "old timber" in Vermont; and "virgin timber" in Louisiana and New York.

Small timber growth is termed "young growth" in Minnesota; "second growth timber" in New York; "immature timber" in Maryland; "young timber" in Texas and Vermont; "non-merchantable woodland" in Connecticut; "second growth—not yet merchantable" in Massachusetts; and "young timber and reproduction" in Louisiana.

For non-producing forest lands and lands producing other than timber growth, there is also a diverse classification and terminology, for example, ten of the organizations reporting use the term "brush lands"; four use the term "cut-over lands"; three, "old burns"; six, "grass land"; New York, "denuded lands"; New Hampshire and North Carolina, "cut-over within three years"; North Carolina, "open lands"; Louisiana, "cull land"; New Hampshire, "agricultural land and fields"; and California, "grain, stubble, and grass land."

DATA OF COMMON INTEREST

The administrative needs of an organization may require details in reporting forest fires of no value to an organization elsewhere, but there are certain salient factors of common interest. Therein lies the opportunity for a standardization of classification and terminology in order that forest fire data may be generally interpreted, co-ordinated, and applied.

Area and Material

Since the immediate need for forest fire data is to determine the extent of damage caused by the fires, the tendency among forest fire organizations is to use a classification of land burned over and of material damaged which will permit a ready computation of value destroyed.

An analysis of the forms used in reporting these data suggests the following classifications as a basis for standardization:

Area burned (in acres).	1.—Forest land. (a) Merchantable growth. (b) Unmerchantable growth. (c) No growth. 2.—Non-forest land.
Damage (in cubic feet or board feet and value). ¹	1.—Merchantable growth. 2.—Unmerchantable growth. 3.—Wood products. 4.—Other forest products. 5.—Other losses.

¹ Howard R. Flint suggests including classes of material damaged.

The well-known principle upon which damage from forest fire is determined is that the owner should be placed in the same position financially after the fire as before it. The need to arrive at a figure acceptable to a jury as representing the damage sustained from forest fires has led to conservative methods by foresters in appraising the loss. Only those factors of loss have been considered for which an established value can be given.

All of the organizations reporting fix a value for damage to salable forest growth, wood products, and other forest products, and to property. In some instances forest growth unsalable on account of size is considered in estimating damages, expectation value, replacement value, and value per acre being used. In no case reported are distinct values fixed for loss of humus, ground cover, and the productive capacity of the soil, presumably on account of the difficulty in making an appraisal and in supporting the appraisal made.

Cause and Cost

The causes of forest fires and the cost of extinction are also of common interest. Data under these headings recognized as important by all organizations and susceptible of standardization are:

Cause of Fire:

1. Railroad.
2. Brush burning.
3. Lumbering.
4. Campers or transients.
5. Incendiary.
6. Lightning.
7. Unknown.²
8. Miscellaneous.

Cost of Extinction:

1. Labor.
 - (a) Permanent.
 - (b) Temporary.
2. Supplies and provisions.
3. Transportation.
4. Other expenses.

Assn. State. Fed. Indiv. Total.

²Howard F. Flint recommends omission of "unknown" and inclusion of "smokers."

DATA OF LOCAL INTEREST

The extent to which further data are reported depends upon the administrative requirements of the organizations. In most instances the reporting form includes the following items of purely local interest:

1. Location:
 - County or town.
 - Township.
2. Date:
 - Month.
 - Day.
 - Hour—a. m. or p. m.
3. Time:
 - Discovered; now and by whom.
 - Reported to organization employe.
 - Work begun.
 - Fire under control.
 - Work finished.
4. Kind and severity of fire:
 - Crown.
 - Surface.
 - Ground.
5. Method used in fighting fire.
6. Weather conditions:
 - Dry.
 - Warm.
 - Windy.

7. Responsibility for fire with names and addresses of suspected parties and evidence.

8. Ownership of property damaged.

MEASURE OF FOREST PROTECTION SECURED

The following table summarizes the data from the reporting states on the percentage of total forest area burned annually, the average annual acre cost of protection, and the estimated acre cost of adequate protection:

State	Per cent of total forest area burned annually	Average annual acre cost of protection	Estimated acre cost of adequate protection
		<i>Cents</i>	<i>Cents</i>
California	4.7 — 5 yr. average	0.4	1.0
Connecticut	2.6 — ?	0.8	3.0
Louisiana	25.0 — ?	0.4	3.3
Maine	0.17 — ?	1.0	2.0
Maryland	1.0 — 5 yr. average	0.3	1.5
Massachusetts	0.8 — ?	2.4	3.0
Minnesota	2.2 — 5 yr. average	0.5 (now 1.5)	2.0
New Hampshire.....	0.1 — 2 yr. average	1.2	⁴ 2.3
New Jersey.....	3.7 — 10 yr. average	2.0	4.0
New York.....	0.11 — 5 yr. average	2.1	⁴ 1.8
North Carolina.....	18.0 — ?	0.2	⁴ 0.8
Oregon	0.8 — 10 yr. average	2.0	2.8
Pennsylvania	1.8 — 4 yr. average	0.3 (now 4)	4.0
Texas	8.0 — ?	0.1	1 to 2
Vermont	0.1	0.3	1.2
Virginia	4.3	0.3	2.0
Washington ³	2.0	3.5	⁴ 3.3
West Virginia ³	0.52	0.4	2.0
Wisconsin	4.0	0.3	1.7
Western Forestry Conservation Association	0.5	2.5	

³ Federal Forest land not included.

⁴ Secured through U. S. Forest Service.

Assuming that all fires are reported and that the areas burned over are correctly estimated, these data indicate for the given states the amount of protection secured in relation to the cost. They show also the range of costs per acre estimated to afford adequate protection and make clear the fact that the same degree of protection is not secured generally at the same cost per acre.

The bases used by the reporting organizations for estimating the measure of forest protection regarded as adequate are: Maximum acre cost of protection; maximum percentage of protected land burned

over annually; averaged acreage per fire; and relation between damage and cost of protection.

Most of the organizations expressed the measure of forest protection needed in terms of cost per acre.

Connecticut and Minnesota believe that adequate protection will have been secured in those states when the annual loss does not exceed 1 per cent and one-half of 1 per cent respectively of the area protected. The cost in Connecticut for this measure of protection is estimated at 3 cents per acre, and in Minnesota the cost to attain its standard is estimated at 2 cents per acre.

Pennsylvania and North Carolina regard the averaged acreage per fire as the important factor in measuring the protection afforded. Pennsylvania aims to reduce the averaged acreage per fire to ten acres or under, which, if attained, and the number of fires is held at the present average, will keep the total area burned annually below 20,000 acres. This would confine the annual loss to an area of about one-sixth of 1 per cent of the total area protected.

Vermont believes that the annual expenditures for forest protection should not exceed the average annual loss.

The committee has not been able to give sufficient study to the subject to recommend a method of determining the adequacy of forest protection. It regards the subject as highly important and one on which there should be substantial agreement among foresters. It believes, therefore, that a further study of it should be made.

CONCLUSIONS

The committee regards it as quite practicable:

1. To have forest organizations agree upon the data to be uniformly reported and to constitute a permanent record of forest fires; and

2. To devise standards for estimating damage from forest fires.

A committee consisting of Messrs. Pettis, Pinchot, and Elliott, appointed by the Association of State Foresters, is now making a study of the standardization of forest protection reports and of standards for estimating fire damage, in response to a demand by its members that uniformity be secured in these directions if at all practicable. It would obviously be a duplication of effort for the Society and the Association of State Foresters to continue the study of these subjects independently.

Your committee believes that its study shows the practicability of standardization in these respects and that the accomplishment of the standardization, in co-operation with the committee appointed by the Association of State Foresters, should now be undertaken.

RECOMMENDATIONS

It is recommended:

1. That the Society co-operate with the Association of State Foresters in determining and adopting uniform methods of reporting data of general interest on forest fires, and in establishing standards for estimating damages from forest fires.

2. That the Society provide for a further study of methods for determining the adequacy of forest protection in order to ascertain whether a uniform method can and should be adopted.

The committee is not prepared at this time to submit recommendations on standardization in other phases of forest protection and for equipment used in forest protection.

Respectfully submitted,

R. Y. STUART,

For the Committee.

The Committee: W. T. Cox, Howard R. Flint, L. S. Murphy, E. O. Siecke, C. P. Wilber, F. H. Brundage, R. Y. Stuart.

REPORT OF THE COMMITTEE ON FORESTRY EDUCATION

At the meeting of the Society of American Foresters in December, 1920, provision was made for a permanent committee on forestry education. The resolution as passed provides for certain ex-officio members and for certain members appointed by the President of the Society. The membership of the committee as first organized was as follows:

Members ex-officio—

J. W. Toumey, New Haven, Conn., Chairman.

R. S. Hosmer, Ithaca, N. Y.

H. H. Chapman, New Haven, Conn.

F. F. Moon, Syracuse, N. Y.

S. T. Dana, Washington, D. C.

E. A. Ziegler, Mt. Alto, Pa.

E. G. Cheyney, St. Anthony's Park, Minn.

K. W. Woodward, Durham, N. H.

R. T. Fisher, Cambridge, Mass.

Members appointed by the President—

H. P. Baker, New York City.
P. S. Lovejoy, Ann Arbor, Mich.
R. D. Forbes, New Orleans, La.

As the Committee of the Society on Standardization in the Classification of Forestry Literature deals with matters of educational nature, it seemed best that this committee be recognized as a sub-committee of the general educational committee. The chairman of the educational committee, in planning for the sub-committees has recognized the old committee on standardization as one of the sub-committees in the new educational committee, with C. F. Korstian as chairman. He asks for the approval of the Society for his action in so doing.

In order to most effectively carry out the work as planned, the committee was organized in March, 1921, with eleven sub-committees. With one exception members of the educational committee, as provided for at the last annual meeting of the Society are the chairmen of the sub-committees. Other members of the sub-committees have been appointed thereon, due to their fitness for the work and their willingness to serve.

Your chairman had hoped to delay the appointment of the sub-committees and the planning of the work for the year until the proceedings of the Forestry Educational Conference held in New Haven in December, 1920, were available. But the delay in this publication made this impracticable.

In the organization of the committee and the appointment of the sub-committees, your chairman, recognizing that many of the reports submitted at the Educational Conference in New Haven were for the most part progress reports, believed it desirable that the chairman of each of the committees that reported at the conference at New Haven continue as the chairman of a sub-committee dealing with the same subject in your Society, on forestry education. With this as a basis, the sub-committees arranged for are as follows:

1. Undergraduate courses in forestry leading to the baccalaureate degree—
R. S. Hosmer, Ithaca, N. Y., Chairman.
Donald Bruce, Berkeley, Calif.
R. R. Fenska, Missoula, Mont.
2. Courses in forestry leading to the degree of Master of Forestry—
H. H. Chapman, New Haven, Conn., Chairman.
S. N. Spring, Ithaca, N. Y.
C. D. Howe, Toronto, Canada.

3. Specialization in forestry—
 F. F. Moon, Syracuse, N. Y., Chairman.
 J. A. Ferguson, State College, Pa.
 A. K. Chittenden, East Lansing, Mich.
4. Training of specialists in forest products—
 S. A. Dana, Augusta, Maine, Chairman.
 H. Winkenwerder, Seattle, Wash.
 O. M. Butler, Madison, Wis.
5. Vocational training in forestry—
 E. A. Zeigler, Mount Alto, Pa., Chairman.
 John Bentley, Jr., Ithaca, N. Y.
 R. S. Maddox, Nashville, Tenn.
6. Extension courses in forestry in colleges and universities—
 K. W. Woodward, Durham, N. H., Chairman.
 R. T. Gheen, Syracuse, N. Y.
 W. R. Mattoon, Washington, D. C.
7. Forest research in educational institutions—
 R. T. Fisher, Cambridge, Mass., Chairman.
 J. S. Illick, Harrisburg, Pa.
 E. H. Clapp, Washington, D. C.
8. The field of public service in forestry by educational institutions—
 H. P. Baker, New York City, Chairman.
 Filibert Roth, Ann Arbor, Mich.
 R. D. Forbes, New Orleans, La.
9. Cooperation in forestry between educational institutions and the private owners of timberland—
 P. S. Lovejoy, Ann Arbor, Mich., Chairman.
 F. H. Sanford, East Lansing, Mich.
 A. B. Recknagel, Ithaca, N. Y.
10. Forestry as an educational discipline in high schools, colleges and universities as a part of the undergraduate curriculum—
 E. G. Cheyney, St. Anthony's Park, Minn., Chairman.
 J. A. Ferguson, State College, Pa.
 C. D. Jarvis, Washington, D. C.
11. Standardization in the classification of forestry literature—
 C. F. Korstian, Ogden, Utah, Chairman.
 A. B. Recknagel, Ithaca, N. Y.
 J. M. Briscoe, Orono, Maine.

In notifying the chairmen of the sub-committees of their assignments, it was requested that each chairman communicate with the members of his sub-committee and outline the plan of work to be undertaken. It was expected and hoped that a report from each sub-committee would be submitted to your chairman not later than December 1, in order to incorporate them in the report at the annual

meeting of the Society. The reports of the various sub-committees are appended to this report and form a part of it.

Early in the year your chairman sent a questionnaire to all educational institutions in the United States and Canada where forestry is taught in order to ascertain to what extent forestry subjects are available as required or as elective subjects in various departments and schools in institutions where forestry is taught. It is believed that certain forestry subjects offered by departments and schools of forestry in our universities should be more widely available and count as credits toward a baccalaureate degree for men who are not candidates for a degree in forestry. The results of this questionnaire are now in the process of tabulation and an article based upon them will be published in the near future.

It is the opinion of your chairman that the educational committee should continue its investigation of the ways and means whereby education in forestry can be extended, more particularly by making available a half year course in general forestry for college and university students, working for the B. S. and B. A. degrees.

The reports of the sub-committees show that in most instances the subjects now in their hands require further consideration, in that their reports are in the form of progress reports. In every case the chairman of the sub-committee has reported. In most instances they have recommended that further consideration be given to the subject assigned them. Your chairman recommends that following the close of this meeting of the Society a recasting of the sub-committees be undertaken by the chairman and new assignments be given to cover special investigations not now provided for, particularly those that the Society at this time may request that the educational committee undertake.

The following are the reports of the sub-committees:

Report of the Sub-Committee on "Undergraduate Courses in Forestry Leading to the Baccalaureate Degree."

In his letter to the other members of the committee of which he was appointed chairman, Professor Hosmer suggested that the committee could perform a very useful service if they thrashed out the question of four against five years as the proper period for the length of a course in professional forestry. As Professor Hosmer's successor on this committee, appointed to act in his place during his absence from the country, I desire to follow out his plans and ideas as closely as possible, and shall therefore act upon another suggestion of his in the same letter, to the effect that a very useful service could be rendered if "we marshal in logical form the arguments for and against these two conceptions."

Responding to Professor Hosmer's letter, both Professor Bruce of California and Professor Fenska of Syracuse presented their arguments, and these are herewith set down in juxtaposition for the purpose of ready comparison.

Arguments for 4-year course.

(Prof. Bruce.)

1. Forestry can be taught adequately in four years with the addition of a full summer in camp under intensive direction, providing the student has a normal high school preparation.

(a) A number of schools are now giving four-year courses which omit no essentials, though they may be rather brief in their treatment of some subjects.

(b) The Yale training of two years after almost any undergraduate work cannot be considered as the equivalent of more than four years of carefully directed undergraduate forestry (it is, of course, a broader, cultural education).

(c) Men graduating from the above courses are not finding themselves handicapped through inadequate preparation when they start to practice their profession.

2. The fifth year of undergraduate work could be better used in getting practical experience.

(a) A college course does not end a man's education.

(b) Much of forestry in particular cannot be taught effectively in college.

(c) The subjects which could be added in the fifth year of college but which must be omitted in the fourth year course are of smaller value than the experience gained out of college during the fifth year.

(d) No subjects which are a part of the normal forestry curriculum are too difficult to be included in undergraduate work.

3. Forestry cannot afford to claim more time than does engineering.

(a) The natural complexity and difficulty of forestry is no greater than that of engineering.

(b) The demands of the profession of forestry on men just graduating from college, or later, are no more severe.

Arguments for 5-year course.

(Profs. Fenska and Bentley.)

1. Argument No. 1 is open to question. Students often arrive in college with inadequate fundamental training in languages, mathematics, and history; it is obvious that the fundamentals are slighted in favor of a schedule overcrowded with subjects which are not well chosen with the idea of forming a sound basis for a superstructure of specialized professional courses. To crowd the college schedule still more is to defeat the object of education. (See last argument No. 5.)

Professor Fenska reports that in Montana, most of their graduates (four-year course) plan on taking a post-graduate course in some forest school.

2. If practical experience is obtained during the vacation periods, as is recommended or required in many schools, the fifth year becomes especially valuable in that it gives an opportunity for the application of the theory to practical forest management. It has been almost universal experience at Cornell that graduate students develop more real ability and acquire more of the requisite maturity of judgment during the fifth year, than at any other period. The subjects which belong in the fifth year, namely, management, administration, finance, etc., are handled easily only by students of mature judgment. To put these subjects any earlier in the course is, in the majority of cases, a waste of time.

3. The practical problems confronting the forester are generally broader in scope and require more independence of judgment and greater administrative skill than is called for from engineers.

The question of remuneration is admittedly a forceful one. Foresters are not paid in proportion to the time and

(c) The remuneration to the forester is not sufficiently more attractive to induce a man to spend extra time in preparing to earn it.

4. Now that the pioneer days are past many of the best students cannot be induced to enter the five-year course, hence a four-year course will on the average graduate better foresters, merely by having attracted better material.

(a) It is the experience of the College of Engineering at this university that the most capable students will not spend a fifth year in college and that the most successful men in the profession have been those who graduated in four years. (The five-year course has now been practically abandoned.)

(b) Other engineering colleges have had the same experience.

(c) A similar tendency has been experienced in several of the Western forestry schools.

money it takes to acquire their training and education. Prof. Fenska points out that advancement of forestry graduates after entering the Forest Service is often retarded because of the lack of sufficient training in fundamental courses.

4. This argument is open to question. Forestry has attracted men of high, unselfish ideals, with a spirit of loyal service to the state and nation; and men of such ideals will not begrudge an extra year of preparation for their life work.

5. In summing up the arguments, it must be said that the preparation for a professional work like forestry is *not* a process of cramming a lot of technical information into a short period, which the student has no time to digest and assimilate; we have too much of that kind of so-called "education" in these days, and the effects are already becoming apparent. What is required is technical skill, combined with good judgment based on *practical experience*, and it is maintained that the necessary training in the fundamental sciences, economics, history, industrial organization, etc., cannot be gotten along with periods of practical experience in the summer vacations in less than five years. In fact, a longer training would be still better. The object of a professional career is not remuneration in money so much as it is the rendering of a *valuable service* to mankind, state and nation. If this service is rendered faithfully the salary and remuneration will be forthcoming.

R. S. HOSMER, *Chairman*.
DONALD BRUCE,
R. R. FENSKA.

Report of the Sub-Committee on Courses in Forestry Leading to the Degree of Master of Forestry. (The Five-Year Standard for Forestry Education.)

"The purposes of a professional education may be regarded as twofold:

1. As an investment of time and money by the student, to be measured against his increased earning power, and kept at the highest ratio to the financial return, or at the minimum which will yield him the greatest probable "rate of interest" or "profit." This is the strictly commercial and individualistic conception of a forestry education.

2. As an effort on the part, both of the institution and of the individual, to prepare him for the greatest possible service both to the public and to himself, irrespective or independent of the factor of financial returns on the investment. This is the conception of higher education which justifies the enormous margin of expense by such institutions over and above the cost to the student. To those to whom the analogy means anything, this conception may be compared with that of the "rotation of highest forest rent," as advocated for *public forests*, as against that of highest "soil rent" or compound interest as sought by private owners.

Exactly in line with this analogy we find that schools which lean strongly to the development of a type of "forest engineer" for employment in private capacity as their main policy, favor a four-year course, while those seeking the general or all-round development of forestry as a public program including education, state activity and private forestry combined, tend to favor five years of training. As is well known, the rotation based on forest rent is longer than that based solely on private profit. The chief object of forestry education or any other education is to make a good citizen.

The strongest argument advanced against the five-year course is that the fifth year does not pay, is not favored by engineers and is not justified by the scale of compensation received by foresters. These arguments may be determinative—

1. For men of limited means who feel that they cannot afford a fifth year.

2. In institutions whose courses are so planned as to crowd all essentials of forestry into a four-year course, either by overloading the schedule, or by omitting important cultural and scientific basic preparation.

3. When adequate and worth-while advanced or matured courses are not offered as distinguished from the four-year undergraduate course.

In the same way, men might decide not to invest in higher education at all, but to get their forestry training at ranger schools or in the woods, and by correspondence courses, involving still less investment and time, and in many instances fitting the recipient adequately for earning a living—as instanced by many graduates of Biltmore or Wyman's School of the Woods.

As viewed from the "forest rent" standard of service to the public and benefit to the individual, the arguments for the fifth year are three, namely, (1) leadership, (2) versatility, (3) specialization.

Leadership

If forestry is to continue and establish itself and to mean something beyond the functions of a logging engineer, it will demand a threefold program as outlined in a previous report of this committee, namely:

1. The establishment of a public policy touching all of the several points of contact between the public and the forest, of which can be mentioned State ownership of forests, forest taxation, extension of forest education, co-operation with forest owners, regulation of forest owners, maintenance of efficient, non-political public forest service.

2. The art of forestry, based on silviculture, and going far beyond logging and utilization. This demands the maintenance of research.

3. The organization of forests, both public and private as a stable and permanent business, on a basis of sustained yield.

Anything short of this program spells the final extinguishment of the forests and with them of the profession and the schools of forestry themselves.

The public, in spite of thirty years of fairly well sustained propaganda, has not yet accepted this program, and are still basking in the outworn and inadequate psychology of the pioneer whose profits are made from exploitation. Employment for foresters public or private in the future as in the past, except as they abandon forestry to assist in forest exploitation, will depend directly upon the success which foresters have as leaders of public opinion in changing this general attitude to the acceptance of a comprehensive and adequate program.

It is practically out of the question to expect such leadership on too narrow a basis of education, and it is as the result of a rather close study of relative efficiency in this line, that the statement can be made that a fifth year, both by selection of individuals and by increase in their powers, more than doubles the average capacity of five-year over four-year graduates for such leadership. To state this is to deny the claim that the time thus spent would be more profitably employed in acquiring practical experience—though it is admitted that a fifth year taken after such a period of practical work is more far-reaching in its effect than if taken without such interlude. Almost any practical job is likely to be confined at first to a narrow or specialized range of work with limited opportunity for broadening the vision. This comes later to those who show the ability to improve their opportunities and take on added responsibility.

Versatility

From the very fact that forestry as such, independent of lumbering and utilization, is not firmly or widely established, and is subject to discouragements, in public life from political misconceptions or shortsightedness, and in private employ, from instability of policy of the owners, the profession has the essential characteristics of pioneering, and *as such*, requires a broad versatile training rather than a narrow technical basis. The forester who has the advantage of a fifth year, provided the curriculum measures up to the proper standard, acquires this versatility to a much greater degree than he can hope to do in a four-year course, and is enabled to enter any one of several openings in forestry or in the allied industries, or afterwards to shift from one field to another in forestry not only without loss of efficiency but with benefit because of increased experience.

Even more important to the individual is the fact that forestry as a pioneer occupation must have its casualties. We cannot expect that public positions in forestry will in every case remain secure, or develop to keep pace with the growth of the individual. The same is true of private employment. There is bound to

be and has been, a constant loss of individuals who find, not at first but later, that they can grow faster if they shift the basis of their occupation. The question of outstanding importance to these persons is, which course best prepares them, other things being equal, to take up other lines should occasion demand it. Based on a very wide acquaintance with individual experiences, the answer is, that the fifth year, properly applied, tremendously increases the ability of the forester to enter many other lines, the strongest tendency being to take up business management of some sort. This has been stated as follows, by a graduate who recently made such a shift—"A forestry education is of such a character that it gives a man the requisite initiative and courage to tackle anything." This versatility is largely the direct product, not of close application to technical forestry subjects, but of the breadth of the curriculum, the outlook it gives on human affairs, and especially the thorough grounding in principles of business management which are seldom thoroughly mastered by undergraduates.

Specialization

The specialist is badly handicapped, whatever line of forestry he pursues, if his specialty rests on too narrow a foundation—for two reasons. First, the growing realization among scientists and educators of the fact that such narrow specialization tends to dwarf and stunt ability rather than develop it; second, the comparative helplessness of men so trained to turn to anything else—which is of unusual importance in forestry as shown, because of the status of the profession. It will hardly be disputed that five years is better than four as a period within which to equip one's self in silvicultural research, wood technology, forest economics, or similar lines.

In conclusion this committee respectfully suggests that the same arguments, and the same principles, apply to higher education in the professions of teaching law and medicine, and that if they do not apply to engineering it is because engineering is more largely confined to a technical line and lacks the broader economic and business aspects of forestry. The tendency in most universities, for all professions, including engineering, is to extend, not shorten the course. Further, that this discussion, if it is intended to advocate the substitution of a five-year course for four years or vice versa, is futile, since there exists an undoubted need for both the four-year and five-year curricula, each for the class of students who desire what it has to offer. The number of students completing a four-year course must remain larger than those who take the fifth year, following the same law of diminishing numbers, which causes the freshman class to outnumber the upper classes. The present attendance of the twenty forest schools giving professional courses is as follows:

Freshmen (1), 555; Sophomores (2), 382; Juniors, 288; Seniors (3), 181; total, 1,406.

Postgraduate or fifth year, 46.

(1) Exclusive of five colleges where courses in these years are not yet differentiated.

(2) Exclusive of four colleges where courses in these years are not yet differentiated.

(3) Inclusive of Juniors or first year men at Yale.

Those receiving degrees in 1921 were: Undergraduates, 118, Postgraduates (4), 26.

(4) Exclusive of six postgraduate students not receiving degrees.

It is about as sensible to argue for the superior advantages of a four-year course in forestry over an extra year as it is to urge the abolishment of graduate schools and postgraduate degrees at our universities. There is no conflict between such standards—they are not mutually exclusive—and schools which do not desire, or are not equipped to arrange a fifth year of instruction in forestry are not for this reason disqualified to teach the subject as a profession.

H. H. CHAPMAN, *Chairman*,
C. D. HOWE,
S. N. SPRING.

Note.—One correction should be noted to a statement by Prof. Bruce in the report on undergraduate instruction. Yale does not admit men, even with an undergraduate degree, who have had "any kind of preparation," but requires specific preparation in sciences, and other indicated subjects, lack of which in any large measure is made the basis of requiring additional preparation for entrance.

Report of the Sub-Committee on Specialization in Undergraduate Training in Forestry.

Specialization in forestry before obtaining the B. S. degree in forestry practically applies only to the New York College of Forestry. The chairman has sent communications to other members of the sub-committee asking for criticisms on the preliminary report presented at the Educational Conference in New Haven last year. As yet, however, our sub-committee is not prepared to present revisions or additions to the report of last year.

FRANKLIN MOON, *Chairman*,
J. A. FERGUSON,
A. K. CHITTENDEN.

Report of the Sub-Committee on the Training of Specialists in Forest Products.

Copies of the report on this topic presented at the Educational Conference in New Haven in December, 1920, were sent to all forest schools and State Foresters and to a considerable number of lumber and other trade journals for their information and criticism. Replies were received from 12 forest schools, 10 State Foresters, and 3 individuals not engaged in educational or State work. These indicate that there is a rapidly growing appreciation among the forest schools of the potential opportunities for foresters in the field of forest products and of the need for more adequately preparing men to enter this field. In a few cases opportunities are already offered for considerable specialization and advanced work, and plans are under consideration elsewhere for expanding or adding to the present courses relating to forest products. Only one or two States are as yet employing men who devote a large part of their time to products work, but a number of others are planning to do so as soon as funds are available. In general it is clear that there is a steadily increasing recognition of the fact that efficient wood

utilization is an essential phase of forest conservation and therefore an integral part of forestry.

The discussion of the past year indicates a rather general acceptance of the principle emphasized in the previous report that men planning to specialize in the field of forest products should have a working knowledge of biology and forestry as well as of engineering and chemistry. When it came, however, to a consideration of the tentative curricula suggested by the committee for providing such training, comments varied all the way from sweeping approval to equally sweeping condemnation. This is neither surprising nor discouraging, but seems to the committee a good indication that the matter is receiving careful thought with a view to working out the best solution in the light of local conditions and problems. The most common criticisms of the curricula are:

1. That they are woefully and unnecessarily weak in cultural subjects, such as languages, logic, history, economics, civics, psychology and philosophy.

2. That they are too rigid, inelastic, and narrow, and should offer more opportunity for electives.

3. That they are better suited to the needs of research workers than of those planning to enter the administrative or business end of industry, in spite of the fact that the demand for the latter will undoubtedly be much greater.

4. That they attempt the impossible task of preparing both a thoroughly trained forester and engineer (or chemist), with the result that the actual result is likely to be a hybrid of little value either as a forester, engineer, or chemist.

The committee recognizes that there is much justice in these criticisms. The curricula were frankly presented as tentative and merely as indicative in a general way of the ground to be covered. They were intended primarily to provoke consideration and discussion, and have apparently served this purpose. The committee believes that there is nothing particular to be gained by the presentation at this time of revised curricula, since in the present stage of forest products education these would still of necessity be more or less academic. In general it believes that any revision should be along the lines indicated by the above criticisms, which it commends to the careful consideration of all interested in the subject.

The committee would, however, like to improve the present opportunity to reiterate its belief in the necessity of providing more adequate opportunities than now exist for the training of men to enter the field of forest products. Since wood is an organic product, and since its utilization is closely connected with its production and with the place occupied by forests in the economic life of the nation, such training should include not only engineering and chemistry but also biology and forestry. It should emphasize primarily a thorough knowledge of the basic sciences, rather than their specific application, although the latter should not be completely overlooked. It should also include as many so-called cultural subjects—"the humanities"—as possible, in order to fit men to become leaders in the business or political world as well as practitioners of their own specialty. The wide variety of work in the field of wood utilization makes it advisable to offer ample opportunity for the election of subjects of particular interests to the student. The popular demand for a four-year course makes it necessary to arrange the work so as to turn out in that time men qualified to fit into some definite job in

the industrial world. Stress should, however, be laid on the desirability of further training to fit men for the more responsible positions and for teaching and research.

The leadership in the training of forest products engineers must be taken by the forest schools of the country. These are better fitted for the work both by their point of view and by the character of the training to be imparted than are the science or engineering schools, although the curricula should be prepared and many of the specific courses must obviously be given in co-operation with the latter. That there is a real need in the wood-using industries for men with a technical training that will more adequately equip them for the work, and that opportunities for the advancement of such men will be limited only by their ability, can hardly be doubted. The field is as yet undeveloped and the pioneers in it will have to win their way by actual proof of their ability to deliver the goods, as did pioneers in the allied fields of forest production and logging engineering. It is up to the forest schools, with the assistance of the rest of the profession, to make such modifications in their curricula as may be necessary to turn out men who will be thoroughly qualified to handle this phase of forestry.

S. T. DANA, *Chairman*,
HUGO WINKENWERDER,
O. M. BUTLER.

Report of the Sub-Committee on Vocational Training in Forestry.

The Chairman of the Sub-committee on Vocational Training in Forestry sent copies of the report on this subject, submitted at the Educational Conference in New Haven a year ago, to members of his sub-committee, that this report might serve as a basis for the work of the present year. It is the opinion of the sub-committee that at this time no revision or addition to the material in the report of last year to the Educational Conference is desirable or practical. We doubt if a constructive advance over the report of last year is possible for vocational training in forestry and report progress at this time.

E. A. ZIEGLER, *Chairman*,
JOHN BENTLEY,
R. S. MADDOX.

Report of the Sub-Committee on Extension Courses in Forestry by Colleges and Universities.

The Sub-committee on Extension Courses in Forestry wishes to submit a progress report for 1921. The whole situation has been carefully canvassed and the most promising immediate project seems to be the formulation of a reading course on the farm woodlot. This would be in the nature of a standard course which could be used by any institutions that could handle such material. It is hoped to have this in definite shape early in 1922.

K. W. WOODWARD, *Chairman*,
R. T. GHEEN,
W. R. MATTOON.

*Report of the Sub-Committee on the Character and Extent of Research by
Schools of Forestry and Departments of Forestry in Colleges and Universities.*

The agencies engaged in research contributory to forestry have recently been clearly defined by John C. Merriam¹ of the National Research Council. His classification is as follows: (1) Research of practical application in engineering laboratories; (2) governmental bureaus and laboratories; (3) research foundations; (4) museums and allied institutions; (5) educational institutions.

In this collective development of research schools and departments of forestry should bear a substantial part. Where the scope of the curriculum and the extent of equipment will permit, forest schools are especially fitted for this kind of work. Their administration is permanent, comparatively unchanging, and favorable to the necessary initiative and freedom in investigators. Moreover, the training of professional foresters, particularly in post-graduate grades, will profit by the inclusion of opportunity for research, both as an educational influence and a means to specialization. It is important, however, to correlate the functions of the forest schools with those of the other agencies in the same similar fields, particularly the Forest Service. The Forest Service is probably best qualified to undertake problems having a general or interstate bearing, while the schools are often better fitted to solve questions of a local or comparatively specific nature.

Fundamental problems, such as those dealing with the laws of growth, are best handled where the qualified men and a favorable directing policy exist. This combination may be found either in a Federal bureau or in educational institutions. The development of general science indicates that universities on the whole are the more favorable places for successful research.² Forest schools with accessible forest tracts under their control are especially well situated for forest research. Exact division of the field, however, is not possible or wise.

To develop the necessary correlation of work both exchange of information on projects proposed or under way and actual co-operation are desirable. The basis of co-operation may well include the following items: Agreement upon a particular project and the working plan for carrying it out; control of execution; division of financial responsibility and understanding as to rights and manner of publication.

It should be the function of some central body such as the Forest Service or the National Research Council to advise and consult frequently with the schools so as to avoid duplication and with the definite purpose of strengthening the hands of competent men who are working under difficulties. Such action would help to stimulate investigative work in general and make for unity in securing legislation.

Any further attempt to standardize forest research by division of the field would be fruitless and inexpedient.

R. T. FISHER, *Chairman*,
J. S. ILLICK,
E. H. CLAPP.

¹ The Function of Educational Institutions in Development of Research. John C. Merriam. Reprint from University of California Chronicle, April, 1920.

² E. H. Clapp, of the committee, desires to be recorded that his experience "leads to the belief that, other things equal, most favorable conditions for research permit investigators to devote their entire time to it, and that investigators in any institution where this is not possible labor under a corresponding handicap."

Report of the Sub-Committee on the Field of Public Service in Forestry by Educational Institutions.

Before attempting to discuss the general question of the field of public service in forestry by educational institutions, it would be well to discuss the relation of forest schools and colleges to what we know as public service. It is safe to assume that a forester is in public service if he is in the employ of the Federal Government, any one of the States, or a municipality or public service organization. In contradistinction to public service in forestry there is the private service of the forester to business organizations or corporations concerned with the use of products of the forest or concerned in the growing and use of forest trees. Under this grouping would come the man who has entered the field of consulting work, though in many instances the consulting forester may be very much in private service in one particular piece of work, and in the next piece of work be very much in public service.

Because of very obvious conditions by far the larger number of foresters in this country have gone into public service. About the only field open to the man who was graduated from a forest school or department in this country, up until 1910, was government service. There are very few foresters carrying on the work of their profession today who have not at some time in their career been connected in some capacity with the Federal Forest Service.

In view of the fact that a very large percentage of the men coming out of our forest schools in the past twenty years have gone into public service, it would seem as if it would be almost unnecessary to discuss the relation of forest schools to public service. The proof of the pudding is in the eating, and the fact that most foresters have gone into public service indicates the connection of forest schools with public service, that is, the forest schools are concerned primarily with the training of men for public service.

A number of foresters who have left governmental service or educational work in forestry for service with trade associations or large corporations engaged in using the forest, have found that it is next to impossible to get away from service to the public along forestry lines. So far as these men have gone they have found that their work with industrial organizations in so far as the general promotion of forestry is concerned is not so different from the work in which they were engaged while connected with federal or State organizations.

Though the men who are with industrial organizations are beyond a doubt serving forestry in a way comparable with the men actually in federal or State employ a peculiar attitude had developed within the profession, the reason for which it is difficult to explain. That is, it would appear that certain groups of professional foresters in the country are ready to conclude that, immediately a forester leaves Government service or educational work, he is in a sense no longer a forester and that he certainly is not living up to the teachings of the forest schools, or the standards assumed to be maintained in the profession. Reference is made to this attitude not in any critical way but merely to point out the peculiar way in which ideas may develop in the gradual standardization of a new profession.

Service to the Public by Educational Institutions

There can be no discussion of the field of public service in forestry by public institutions without considering the extent to which educational institutions generally are serving the public in ways in which they are particularly fitted to serve. Examples of the way in which educational institutions are serving the public are almost too numerous and too well known to describe. A standard example is that of the service of the University of Wisconsin to the people of the State of Wisconsin.

Both the forest schools and the professional foresters in the country are losing tremendous opportunities for development if they do not appreciate the service which can be given the public, along forestry lines. There is a service in the way of assistance in problems confronting states, municipalities, industries and individuals; either in the use of the products of the forest or in renewing and maintaining forest areas, which will reflect immediately to the credit of the institution and the profession. We do not need to argue that forestry as a profession is established and recognized in this country, yet the forester has but to meet the man in the street to be forced to explain just what forestry means and why forestry should be considered in any serious way by the people of the country. Reference is made to this attitude merely to indicate the fact that there is a tremendous amount of educational work to be done in this country before the Federal Government and the States will take up forestry in a serious and an effective way. Service as indicated above is one of the most effective means of educating the public.

There is no way in which the educational institutions, or the individual forester, can serve the institution or himself more effectively than through assistance to the public in problems which the public feel are practical and of vital importance. If, for instance, the forest schools can show an industrial plant how to utilize more effectively the wood which passes through the plant from day to day, or if it can be shown how local wood using industries can be maintained and made permanent by use of kinds of wood not now used or by opening up a supply in sections not now readily available. Again, if the officials and the people of a local community can be assisted in planting up idle lands about the community or in planting for some protective purposes, conclusive evidence is given that forestry is fundamental to the life of the people.

This statement is hardly more than the personal opinion of the chairman expressed in a rather brief and preliminary way. It is the intention of the chairman to consult further with the other members of the committee and there has already been some correspondence to see if it will not be possible to secure, through questionnaire or in some other way, a statement from each of the Forest Departments or schools in the United States and Canada. It is in no sense the intention of the chairman to present a preliminary statement of this kind as a complete report of the committee.

HUGH P. BAKER, *Chairman.*

Note.—This progress report has not been submitted to Prof. Filibert R  th, University of Michigan, Ann Arbor, Mich., or R. D. Forbes, Department of Conservation, New Orleans, La., the other members of the committee, and therefore has not been passed upon by them.

Report of the Sub-Committee on Co-operation Between Educational Institutions Teaching Forestry and the Private Owners of Timberlands.

Summary.—Your committee finds the situation inquired into in unsatisfactory condition, presents data and observations to that effect, but considers that there is no occasion, at this time, for the Society to follow the subject farther, save as suggested under "Conclusion."

General Statement.—Your committee considered that its first activity should be an inquiry into the general status of the co-operative work between forest schools and private timberland owners. To supplement individual inquiry and past experience, this was attempted by a questionnaire which was sent out at the end of October. Up to November 25, only fourteen of the twenty-two schools on the Forest Service list of June, 1919, had returned replies, but since replies were received from the several forest regions and from nearly every class of school, it is assumed that the returns are fairly typical of present conditions.

In general, the conditions appear to be rather chaotic and to a degree and manner not wholly to be accounted for by local forest conditions or the difference in type of schools. The form of the questionnaire may have been subject to criticism and did not lack for it but can still hardly account for the failure of nearly half the schools to fill out and return the blanks, for the giving of but part of the information asked for or for unintelligible, evasive or illegible entries. In some cases an actual lack of candor seemed evident. The committee is inclined to consider this phase, also, as being fairly typical of a prevailing condition.

Returns from Questionnaire.—Each of the fourteen schools reported offering some manner or degree of assistance to private timberland owners, comments being: "as integral part of State forest work;" "so far as it does not interfere with teaching duties of faculty;" and "limited amount only."

Nine of the reporting schools state their co-operative work to be casual and incidental; five report definitely organized and advertised Extension Departments.

The character of the advice and assistance being offered timberland owners evidently varies greatly. Five schools report their willingness and indicate their ability to assist the owner with a full examination, cruise, appraisal, marking, marketing and written report and that they keep a check on results. But several of the five otherwise indicate that they are actually doing very little such work. Comments run: as to various of the items—"sometimes;" "complete job only when sustained yield is agreed-on;" "complete job only on areas over 300 acres;" "all items except marketing;" "special accent on market;" "can arrange details to suit owner."

Standard arrangements as to compensation there seem none, each school arranging this as it is able or sees fit or according to local precedent or whim or need. Four reports leave the item blank. Comments run: "If 'educational work,' owner pays field expenses; if in co-operation with Farm Bureau, or 'demonstration,' owner pays part;" "Depends on circumstances." "Depends on who does work." "Free if done by classes; if done by faculty men \$15-25 a day and expenses." "Owner pays actual expenses: no fee." "Small owners free; corporations and large owners pay expenses." "If under 300 acres owner pays expenses; if commercial job refer to consulting forester." "Per diem and expenses if work is of financial value to owner." "Actual cost only." "Actual time plus expenses."

Reports as to the average sums actually paid by owners were left blank in seven instances. Those reporting at all run: \$20, \$30, \$10-15, \$10-50, \$15-25, "\$5 per day and expenses," and "expenses."

As to the total number of co-operative cases per year and the percentage of these which cost the owner something, very little can be learned from the replies. Five were left blank. One reports "51 inspections, 15 demonstrations;" another "15," another "10-15," and one "8;" the balance "several," "uncertain," "not known locally," and "mighty few." Of the total cases, only four are listed as costing the owner anything.

Whether faculty members do consulting work in private capacity was left blank by one school, answered "Yes" by eight, "No" by two, and "rarely," "seldom," and "limited amount." Comments run: "vacations only," "some."

Whether the faculty members take outside consulting work with or without the official consent of their institutions is not clearly brought out by the reports. Five left the item blank. Four said "with" and one "without." Comments run: "vacations only," "depends on importance of work, chances for research, etc.," "with or without, depending on official duties."

The basis of the charges made by faculty men while employed in private capacity are reported only as follows: "per diem," "personal arrangements," "cruiser's wages," and "no fixed basis."

Four reports name two other public organizations in their States which also offer assistance to private timberland owners; three name one other. In three instances the reports made no reference to notoriously competing and similar institutions within their own States. One comments "none to our knowledge," one leaves the item blank.

Whether private foresters are offering their services in the State is answered "No" by six, "Yes" by six, "not free service," and by one with a question mark.

All the reports agree in stating that there is no competition between the public and the private agencies, save two, which remark "hardly" and nothing at all. Comment runs: "we do not accept essentially commercial work" and "no discussion yet arisen."

The inquiry whether there was any agreement or understanding between the several agencies as to the appropriate field of each was left blank in five reports, was answered "No" by five and commented on by the rest: "we examine and advise but leave actual work with our trained men," "none required at present," "mutual agreement with State only." One entry was illegible.

No suggestions for the bettering of the present situation as regards understandings and agreements between the several agencies were made.

That the total of the assistance available to timberland owners in their States is adequate, was reported "Yes" by five, "No" by two, and by others: "believe so," "usually," and "most large owners have their own trained men." One left the item with a question mark.

All reports agree in anticipating an increased demand for timberland owners for advice and assistance and there seems general agreement that the increased demand should be met by parallel expansion of the State, school and private agencies, but one report recommends that "new work be left to other fellows—schools to teach

only," and one looks to see the school alone take care of the new demand, another the State alone, still another thinks the private agencies will do the work best.

Conclusions.—(1) Failure on the part of nearly half the schools to respond to the questionnaire, and a certain lack of candor in the filling out of some of those returned, confirms our impression that the situation is far from admirable or satisfactory.

(2) Local conditions in and about the several forest schools, and differences in surrounding forest conditions are so great as to involve, of necessity, great variations in the needs and facilities for extension work with timberland owners.

(3) The variations in the extension facilities being offered or supplied by the several schools are even greater than necessary and largely conditioned by the current policies at the school rather than by the need or demand for such work.

(4) Extension service which is merely casual, informal and unorganized is not apt to be of high quality or satisfactory.

(5) The most satisfactory machinery for a school's co-operative work with timberland owners is the regular, well organized and well advertised Extension Department.

(6) With few but notable exceptions we are inclined to doubt that the form or degree of assistance being offered timberland owners by the schools is either adequate or competent and we think it very possible that neglect and incompetence in this work is demonstrated by the rather astonishingly few calls for such work which the average school reports receiving.

Even the strongest of the few (forest) Extension Departments now in operation are receiving less support and attention than is required to enable them to meet adequately the current needs of timberland owners. Such current needs, of course, are not indicated by the number of calls received.

(7) There is little co-ordination between the extension work of the several schools and the other public and private agencies concerned with similar or identical work and little evidence that such co-ordination will shortly be made or attempted.

(8) It appears evident that local silvicultural, economic and political considerations vary so greatly or so often that the extension work of the several schools will continue in its present unsatisfactory condition and that in one place it will be a school, in another place it will be, say, a State forester, and in still another place it will be private agencies which will actually undertake and accomplish adequate assistance to the owner of timberlands.

(9) This committee finds little promise that further inquiry within its assigned field will prove worth while and does not recommend that such further inquiry be authorized by the Society at this time. It does recommend that specialists in forestry extension be brought together to consider means for developing and stabilizing their work.

P. S. LOVEJOY, *Chairman.*

A. B. RECKNAGEL, } *By authority.*

F. H. SANFORD, }

Ann Arbor, Michigan, December 3, 1921.

Report of the Sub-Committee on Forestry as an Educational Discipline in High Schools, Colleges, and Universities as a Part of the Undergraduate Curriculum.

In an endeavor to collect the necessary data for this report, your committee sent inquiries to thirty-six colleges and universities at which forestry courses had been reported. Answers were received from twenty-six of these institutions.

At twelve out of the twenty-six forestry was represented in the faculty by a unit of some kind—either college or division.

At five others, certain forestry courses were offered by state foresters or others outside the institution.

At five others, certain forestry courses were offered by the horticultural departments and at two others by the botany departments, and at one some phases of forest management were given by the farm management division.

At one institution such courses had been dropped.

Technical Courses Open to Election.—In almost every institution where there are technical forestry courses, at least some of these courses are open to election by students in other departments. There are apparently only two exceptions.

This is true of such courses as elementary forestry, general forestry, forest economics, dendrology, and the like. There is nothing to indicate that other more advanced courses would not be open in the same way if the prerequisites are covered. The objections would probably come from the other departments which would not accept such specialized advanced work for their degrees.

In no cases are special general courses offered for election in the institutions where technical forestry courses are taught. Such general courses are offered only where they are the only courses in forestry, and are usually offered by the horticultural or botany departments.

Special Courses Open to Agricultural Students.—In practically all of these institutions where there was a curriculum in Agriculture certain specialized courses in forestry were offered, either as a required part of the curriculum or as recommended electives. Such courses as farm forestry, woodlot management, tree crops, etc. The State Forester or some other outside agency is very often called in to give such courses where there are no foresters on the faculty, and they seem to be very generally considered of value as a part of the Agricultural course.

The tendency seems to be toward requiring a certain amount of forestry—that part of it at least that deals with the farm woodlot or the windbreak—in the Agricultural curricula.

Possibilities.—It seems better to call the deductions from this all too brief survey "possibilities" rather than recommendations. Considerably more data should be collected before very weighty recommendations could be made.

It would seem that the forestry faculties are neglecting a distinct "possibility" when they do not offer a general, comprehensive course to the election of students in other departments and colleges. They would undoubtedly be accused of propaganda and it would be propaganda in a way, but it would be a perfectly legitimate propaganda advertising the history, condition and dire need of one of the nation's indispensable natural resources.

There seems to be sufficient precedent for such action. Chemistry departments always offer a general course in chemistry, open to all students in every depart-

ment and accepted by credit in all departments. The same is true of botany, biology, and geology. To be sure, those courses are usually preparatory to continuation courses in those same lines, but they are nearly always modified to a certain extent to make them both more complete and more attractive to students in search of general information and unlikely to take further work along that line.

This is even more true of certain courses in English literature, sociology, psychology, art, law, hygiene.

Why should not the academic student be given the same opportunity to learn something of one of the greatest problems before the American people? This is a particularly pertinent question when we consider that the public is more than ordinarily ignorant on this question and that till they are educated to its vital importance there can be no adequate progress.

The data collected show that such courses have not been very generally offered by forestry divisions or very generally elected by academic students when offered, but they do not show why.

Several possible explanations offer themselves. Those giving technical instruction in any line are apt to consider popularized lectures not worth while. (2) So little is known of forestry work that students outside of that specialization never think to look to that department for a general elective. (3) The possibilities of such a course are not recognized by those faculty members who advise academic students. (4) The forestry work is geographically separated from the academic work and inconvenient for the academic student.

There are a number of ways in which these obstacles could be overcome. Special notices of such courses could be inserted in the academic catalogues, letters calling the attention of advisers to the possibilities of such courses could be sent out or the matter presented at academic faculty meetings, or the courses could be offered by the foresters in an academic department such as economics. The last seems to have considerable possibilities and some strong precedents.

There seems to be a good opportunity here to get for forestry just such support as it needs and should the Society decide that it is advisable to push this work further data should be collected to determine the best method of presentation both in colleges and high schools.

E. G. CHEYNEY,
J. A. FERGUSON.

It is the desire of the chairman of your committee, that if practical this report of the Educational Committee be printed, together with the reports of the sub-committees in order that foresters and others interested may learn of the organization of the Educational Committee and be able to communicate with the member or members working on the particular educational top in which they are interested. It is believed that the report of the Educational Conference, which is now in press, supplemented by this report of the Educational Committee, form a satisfactory basis for further work.

Respectfully submitted,

J. W. TOUMAY,
Chairman.

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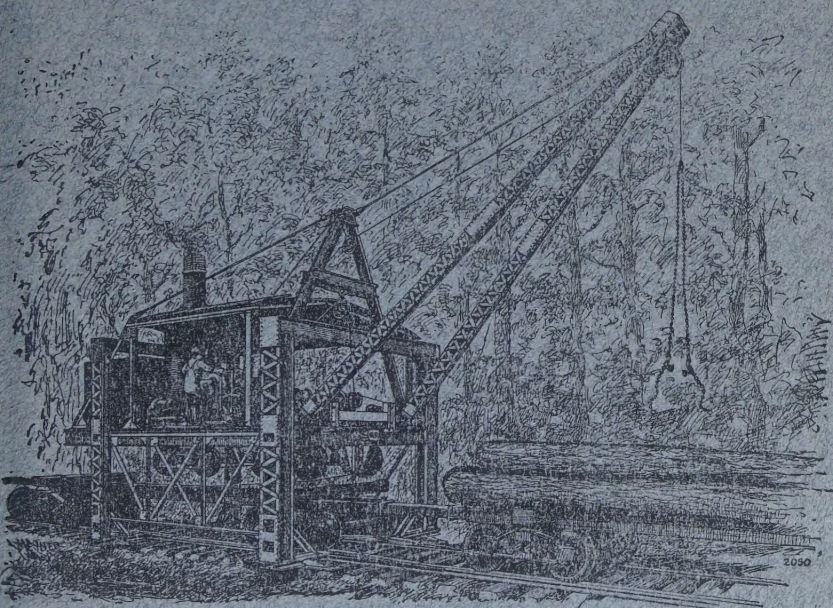
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